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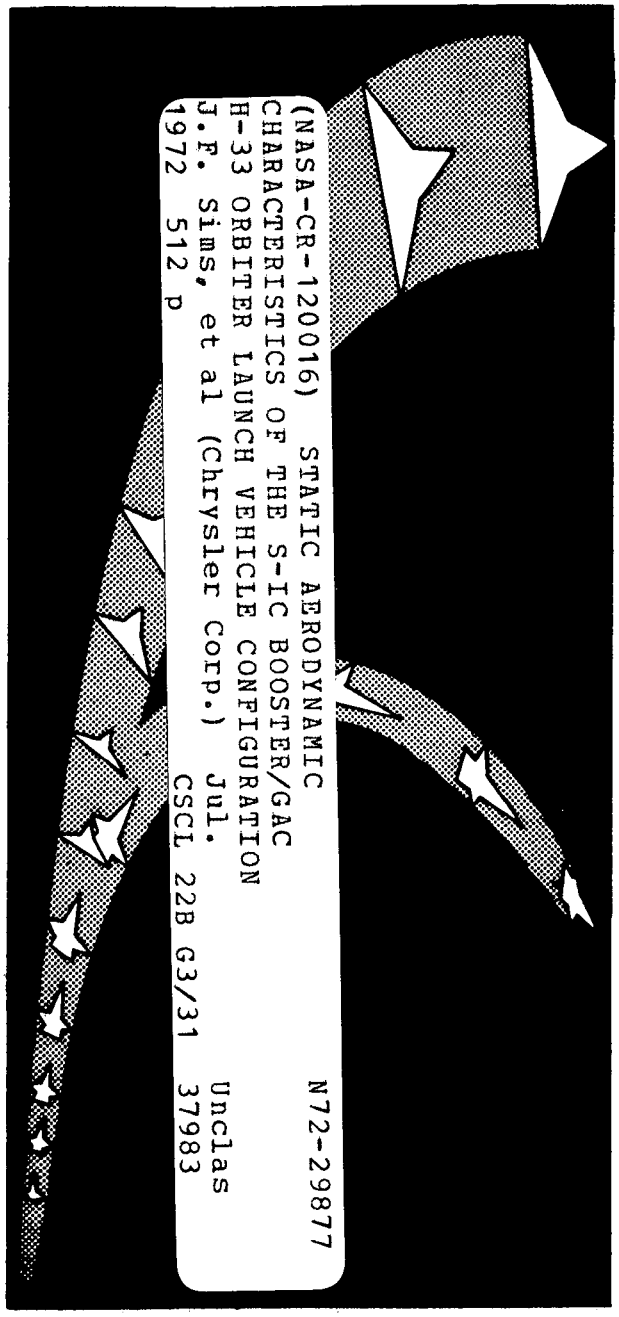

STATIC AERODYNAMIC CHARACTERISTICS OF THE S-IC BOOSTER/GAC H-33 ORBITER LAUNCH VEHICLE CONFIGURATION

by

J.F. SIMS, MSFC
R.W. AINSWORTH, TBC

MSFC 14-INCH
TRISONIC WIND TUNNEL

Marshall Space
Flight Center

SADSAC SPACE SHUTTLE
AEROTHERMODYNAMIC
DATA MANAGEMENT SYSTEM

CONTRACT NAS8-4016
MARSHALL SPACE FLIGHT CENTER

SPACE DIVISION CHRYSLER CORPORATION

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SADSAC/SPACE SHUTTLE

WIND TUNNEL TEST DATA REPORT

CONFIGURATION: .003366 Scale S-IC/Grumman H-33 Drop Tank Orbiter

TEST PURPOSE: Determine Static Aerodynamic Characteristics of the S-IC Booster/GAC H-33 Orbiter Launch Vehicle Configuration

TEST FACILITY: MSFC 14" Trisonic Wind Tunnel

TESTING AGENCY: The Boeing Company

TEST NO. & DATE: MSFC TWT 502; September 2, 1971

FACILITY COORDINATOR: Mr. Jim Weaver - (NASA/MSFC)

PROJECT ENGINEER(S): Mr. Frank Sims - (NASA/MSFC)

Mr. R. W. Ainsworth - (TBC)

DATA MANAGEMENT SERVICES

LIAISON: William M. Hale for V. W. Sparks DATA OPERATIONS: J. R. Miller

RELEASE APPROVAL: F. D. Kemp, Supervisor
Aero Thermo Data Group

CONTRACT NAS 8-4016 AMENDMENT 158 DRL 297 - 84a

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FACILITY COORDINATOR:

Mr. J. Weaver
Marshall Spaceflight Center
Mail Stop S & E-AERO-AAE
Huntsville, Alabama 35801

Phone: (205) 453-2512

PROJECT ENGINEERS:

Mr. J. F. Sims
Marshall Spaceflight Center
Mail Stop S&E-AERO-AAE
Huntsville, Alabama 35801

Phone: (205) 453-2512

Mr. R. W. Ainsworth
Mail Stop JC-35, ORGN 594-13
The Boeing Company
Huntsville, Alabama 35807

Phone: (205) 895-2990

SADSAC LIAISON:

Mr. V. W. Sparks
Chrysler Corporation Space Division
102 Wynn Drive
Huntsville, Alabama 35805

Phone: (205) 895-1560

SADSAC OPERATIONS:

Mr. J. R. Ziler
Chrysler Corporation Space Division
P. O. Box 29200
Department 2780
New Orleans, Louisiana 70129

Phone: (504) 255-2304

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AERODYNAMIC CHARACTERISTICS OF THE S-IC BOOSTER/GAC H-33 ORBITER LAUNCH VEHICLE CONFIGURATION

BY
J. F. SIMS, R. W. AINSWORTH

SUMMARY

This test was conducted at the MSFC 14-Inch Trisonic Tunnel commencing Thursday, September 2, 1971, and continuing through noon Wednesday, September 8, 1971, for a total of 49 test hours. The test was divided into two parts. The first part, constituting over 80 percent of the entire test, utilized the H-33 orbiter with drop tanks and cradle mounted on an S-IC booster with 75 square-foot fins oriented 45° off the horizontal and vertical reference planes. The booster was sting mounted on the MSFC #200 strain gage balance. Runs were initially made at orbiter incidence angles (relative to the booster centerline) of +1.24, 0 and -2 degrees to determine the optimum incidence angle to be used for the remainder of the test. The angle so determined was 0 degrees. Additional testing was performed with drop tanks removed, orbiter vertical tail removed, drop tanks and orbiter wing removed, booster fins removed and booster fins located in the horizontal and vertical reference planes. Runs were also made with the tunnel sting rolled (model and balance) 20°, 45° and 70° to obtain combined α-β data. The angles of attack and sideslip in the data plane were determined as shown in the Data Reduction section.

The second part utilized the H-33 orbiter and cradle only, sting mounted on the MSFC #201 strain gage balance. These data were used in conjunction with MSFC test number 504 (orbiter alone on balance) to determine cradle effects. The model scale was 0.003366.

NOMENCLATURE

(General)

SYMBOL	SADSAC SYMBOL	DEFINITION
α	ALPHA	angle of attack, angle between the projection of the wind X_w-axis on the body X, Z-plane and the body X-axis; degrees
β	BETA	sideslip angle, angle between the wind X_w-axis and the projection of this axis on the body X-Z-plane; degrees
ψ	PSI	yaw angle, angle of rotation about the body Z-axis, positive when the positive X-axis is rotated toward the positive Y-axis; degrees
ϕ	PHI	roll angle, angle of rotation about the body X-axis, positive when the positive Y-axis is rotated toward the positive Z-axis; degrees
ρ		air density; K_g/m^3, slugs/ft^3
a		speed of sound; m/sec, ft/sec
V		speed of vehicle relative to surrounding atmosphere; m/sec, ft/sec
q	Q(PSI) Q(PSF)	dynamic pressure; $1/2\rho V^2$, psi, psf
M	MACH	Mach number; V/a
RN/L	RN/L	Reynolds number per unit length; million/ft
p		static pressure; psi
P		total pressure; psi
C_p	CP	pressure coefficient; $(p-p_\infty)/q$

NOMENCLATURE (Continued)

Reference & C. G. Definitions

SYMBOL	SADSAC SYMBOL	DEFINITION
S		wing area; m^2, ft^2
S	SREF	reference area; m^2, ft^2
$\bar{c}$		wing mean aerodynamic chord or reference chord; m, ft, in (see ℓ_{ref} or LREF)
ℓ_{ref}	LREF	reference length; m, ft, in.; (see $\bar{c}$)
b_{ref}	BREF	wing span or reference span; m, ft, in
A_b		base area; m^2, ft^2, in^2
c. g.		center of gravity
MRP	MRP	abbreviation for moment reference point
	XMRP	abbreviation for moment reference point on X-axis
	YMRP	abbreviation for moment reference point on Y-axis
	ZMRP	abbreviation for moment reference point on Z-axis

NOMENCLATURE (Continued)

Axis System General

SYMBOL	DEFINITION
F	force; F, lbs
M	moment; M, in-lb

Subscript	Definition
N	normal force
A	axial force
L	lift force
D	drag force
Y	force or moment about the Y axis
Z	moment about the Z axis
X	moment about the X axis
s	stability axis system
w	wind axis system
ref	reference conditions
∞	free stream conditions
t	total conditions
b	base

NOMENCLATURE (Continued)

Body & Stability Axis System

SYMBOL	SADSAC SYMBOL	DEFINITION
		Body Axis System
C_N	CN	normal force coefficient; F_N/qS
C_A	CA	axial force coefficient; F_A/qS
C_{A_b}	CAB	base axial force coefficient; $\left[-1\right]\left[(p_b - p_\infty)/q\right](A_b/S)$
C_{A_f}	CAF	forebody axial force coefficient; $C_A - C_{A_b}$
C_n	CYN	yawing moment coefficient; $M_Z/qS\ b_{ref}$
C_ℓ	CBL	rolling moment coefficient; $M_X/qS\ b_{ref}$
		Common to Both Axis Systems
C_m	CLM	pitching moment coefficient; $M_Y/qS\ \ell_{ref}$
C_y	CY	side force coefficient; F_Y/qS
		Stability Axis System
C_L	CL	lift force coefficient; F_L/qS
C_D	CD	drag force coefficient; F_D/qS
C_{D_b}	CDB	base drag coefficient
C_{D_f}	CDF	forebody drag coefficient; $C_D - C_{D_b}$
C_n	CLN	yawing moment coefficient; $M_{Z,s}/qS\ b_{ref}$
C_ℓ	CSL	rolling moment coefficient; $M_{X,s}/qS\ b_{ref}$
L/D	L/D	lift-to-drag ratio; C_L/C_D
L/D_f	L/DF	lift to forebody drag ratio; C_L/C_{D_f}

ADDITIONS TO NOMENCLATURE

CNAFO	Zero angle of attack normal force coefficients, $CN(\alpha=0)$
CLMAFO	Zero angle of attack pitching moment coefficient, $CLM(\alpha=0)$
CAAFO	Zero angle of attack total axial force coefficient, $CA(\alpha=0)$
CAFAFO	Zero angle of attack forebody axial force coefficient $CAF(\alpha=0)$
CABAFO	Zero angle of attack base axial force coefficient, $CAB(\alpha=0)$
ALFCNO	Zero normal force angle of attack, $\alpha(CN=0)$
CLMCNO	Zero normal force pitching moment coefficient, $CLM(CN=0)$
DCLM/DCN	Static longitudinal stability derivative, $\delta CLM/\delta CN$
DCYN/DCY	Static lateral stability derivative, $\delta CYN/\delta CY$
CNAAFO	Normal force coefficient derivative, $\delta CN/\delta\alpha(\alpha=0)$
CMAAFO	Pitching moment coefficient derivative, $\delta CLM/\delta\alpha(\alpha=0)$
DCY/DBETA	Side force coefficient derivative, $\delta CY/\delta\beta(\beta=0)$
DCYN/DBETA	Yawing moment coefficient derivative, $\delta CYN/\delta\beta(\beta=0)$
DCBL/DBETA	Rolling moment coefficient derivative, $\delta CBL/\delta\beta(\beta=0)$
CP/D	Longitudinal center of pressure location, $CLM\alpha/CN\alpha(\alpha=0)$
YCP/D	Lateral center of pressure location, $CYN\beta/CY\beta(\beta=0)$
DCN	Normal force coefficient increment, ΔCN
DCLM	Pitching moment coefficient increment, ΔCLM
DCA	Total axial force coefficient increment, ΔCA
DCAF	Forebody axial force coefficient increment, ΔCAF
DCNA	Normal force coefficient gradient increment, $\Delta CN\alpha$
DCLMA	Pitching moment coefficient gradient increment, $\Delta CLM\alpha$
DCY	Side force coefficient increment, ΔCY

ADDITIONS TO NOMENCLATURE
(CONTINUED)

DCYN	Yawing moment coefficient increment, ΔCYN
DCBL	Rolling moment coefficient increment, ΔCBL
DCYB	Side force coefficient gradient increment, $\Delta CY\beta$
DCYNB	Yawing moment coefficient gradient increment, $\Delta CYN\beta$
DCBLB	Rolling moment coefficient gradient increment, $\Delta CBL\beta$
DCN(ALPHA=0)	Normal force coefficient increment at ALPHA=0, $\Delta CN(\alpha=0)$
DCLM(ALPHA=0)	Pitching moment coefficient increment at ALPHA=0, $\Delta CLM(\alpha=0)$
DCA(ALPHA=0)	Total axial force coefficient increment at ALPHA=0, $\Delta CA(\alpha=0)$
DCAF(ALPHA=0)	Force axial force coefficient increment at ALPHA=0, $\Delta CAF(\alpha=0)$
DCNA(ALPHA=0)	Normal force coefficient gradient increment at ALPHA=0, $\Delta CN\alpha(\alpha=0)$
DCLMA(ALPHA=0)	Pitching moment coefficient gradient increment at ALPHA=0, $\Delta CLM\alpha(\alpha=0)$
WNGINC	Orbiter incidence angle in degrees relative to booster centerline

CONFIGURATIONS INVESTIGATED

The following models and model components were utilized during this test:

O	Grumman Orbiter Body H-33
V	Orbiter Vertical Stabilizer
W	Orbiter Clipped Delta Wing
T	Orbiter Drop Tanks
C	S-IC/Orbiter Adapter Cradle
B	S-IC Booster
F	S-IC 75 Square-Foot Fins Oriented 45° Off Vertical and Horizontal Reference Plane
F_1	S-IC 75 Square-Foot Fins Oriented in Horizontal and Vertical Reference Plane

Pertinent dimensional information is presented in the Model Component Description Section.

TEST FACILITY DESCRIPTION

The Marshall Space Flight Center 14" x 14" Trisonic Wind Tunnel is an intermittent blowdown tunnel which operates by high pressure air flowing from storage to either vacuum or atmospheric conditions. A Mach number range from .2 to 5.85 is covered by utilizing two interchangeable test sections. The transonic section permits testing at Mach 0.20 through 2.50, and the supersonic section permits testing at Mach 2.74 through 5.85. Mach numbers between .2 and .9 are obtained by using a controllable diffuser. The range from .95 to 1.3 is achieved through the use of plenum suction and perforated walls. Mach numbers of 1.44, 1.93 and 2.50 are produced by interchangeable sets of fixed contour nozzle blocks. Above Mach 2.50 a set of fixed contour nozzle blocks are tilted and translated automatically to produce any desired Mach number in .25 increments.

Air is supplied to a 6000 cubic foot storage tank at approximately $-40^{\circ}F$ dew point and 500 psi. The compressor is a three-stage reciprocating unit driven by a 1500 hp motor.

The tunnel flow is established and controlled with a servo actuated gate valve. The controlled air flows through the valve diffuser into the stilling chamber and heat exchanger where the air temperature can be controlled from ambient to approximately $180^{\circ}F$. The air then passes through the test section which contains the nozzle blocks and test region.

Downstream of the test section is a hydraulically controlled pitch sector that provides a total angle of attack range of 20° ($\pm 10^{\circ}$). Sting offsets are available for obtaining various maximum angles of attack up to 25°.

REDUCTION OF DATA

I. S-IC BOOSTER ON BALANCE (RUNS 1 THROUGH 105)

Six component aerodynamic force and moment data were recorded using MSFC internal strain gage balance #200. Two base pressures ($C_{P_{b1}}$ and $C_{P_{b2}}$) and balance cavity pressures (C_{P_c}) were also recorded and utilized to correct the axial force measured (C_{A_T}) reading to a condition corresponding to free-stream pressure acting at the base and cavity regions (C_{A_F}). The two base pressures were averaged and considered to act as one over the model base.

$$C_{P_b} = \frac{C_{P_{b1}} + C_{P_{b2}}}{2}$$

$$C_{A_F} = C_{A_T} - \left[C_{P_b} \left(\frac{A_b}{S_{ref}}\right) + C_{P_c} \left(\frac{A_{cav}}{S_{ref}}\right)\right]$$

The force and moment data were reduced to coefficient form using the following reference values:

S_{ref} = S-IC booster body maximum X-section area = 1.396 in^2

ℓ_{ref} = b_{ref} = S-IC base diameter = 1.333 in.

A_b = Booster base area = 1.039 in^2

A_{cav} = Booster balance cavity X-section area = 1.131 in^2

Moment Reference Center:

X = 5.399 inches from S-IC base (5.507" aft of orbiter nose)

Y = Z = 0 inches from S-IC centerline

During one portion of the test (Runs 20 through 31 and 75 through 77) the tunnel sector was pitched $\pm 10^{\circ}$ with the model and balance rolled 20°, 45°, and 70°. To determine the angle of attack and sideslip in the data plane (rotating body axes) the following were used:

$$\alpha = \text{Tan}^{-1} [\text{Tan } \alpha_s \text{ Cos } \phi] + \Delta\alpha$$

$$\beta = \text{Sin}^{-1} [\text{Sin } \alpha_s \text{ Sin } \phi] + \Delta\beta$$

α_s = Tunnel sector pitch angle

$\Delta\alpha, \Delta\beta$ = Change in angle due to sting deflections

ϕ = Sting roll angle

II. ORBITER PLUS CRADLE ON BALANCE (RUNS 106 THROUGH 122)

Six component aerodynamic force and moment data were recorded using MSFC internal strain gage balance #201. Orbiter base pressures ($C_{P_{bo}}$), balance cavity pressures (C_{P_c}) and cradle base pressures ($C_{P_{bS}}$) were also recorded and utilized to correct the axial force measured (C_{A_T}) reading to a condition corresponding to free-stream pressure acting at the base and cavity regions (C_{A_F}).

$$C_{A_F} = C_{A_T} - \left[C_{P_{b_o}} \left(\frac{A_{b_o}}{S_{ref}}\right) + C_{P_c} \left(\frac{A_{cav}}{S_{ref}}\right) + C_{P_{bs}} \left(\frac{A_{b_c}}{S_{ref}}\right)\right]$$

REDUCTION OF DATA
(Continued)

The force and moment data were reduced to coefficient form using the following reference values:

S_{ref} = S-IC booster body maximum X-section area = 1.396 in^2

ℓ_{ref} = b_{ref} = S-IC base diameter = 1.333 in.

A_{b_o} = Orbiter base area = 0.362 in^2

A_{cav} = Orbiter balance cavity X-section area = 0.399 in^2

A_{b_c} = Cradle base area = 0.371 in^2

Moment Reference Center:

X = 5.507 inches aft of orbiter nose

Y = 0 inches from balance centerline

Z = 0.425 inches below balance centerline

These values were used so as to locate the moment reference center at the same location as was used for the booster-on-balance portion of the test.

TABLE 1. DATASET COLLATION SHEETS

TEST IWT #502 DATA SET/RUN NUMBER

COLLATION SUMMARY

☐ PRETEST

☒ POSTTEST

DATA SET IDENTIFIER	CONFIGURATION	SCHD. α	SCHD. β	PARAMETERS/VALUES i₀	PARAMETERS/VALUES ∅			NO. of RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE) 0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.46	1.96	3.5	4.96	
RU4031	OWVTCBF	A	O	-2	0			4				11	12	13	14					
RU4011	OWVTCBF	I	I	1.24	I			4				7	8	9	10					
RU4021	OWVCBF	I	I	1.24	I			2				16	15							
RU4041	OWVTCBF	A	O	0	0			11	19	45	46	3	4	5	6	83	74	89	88	
RU4045	I	O	B		90			9	36			35	34	33	32	84	73	86	87	
RU4042	I	S	S		20			5	20			21	22		23		75			
RU4043	I	I	I		45			5	27			26	25		24		76			
RU4044	OWVTCBF	S	S		70			5	28			29	30		31		77			
RU4101	OWVTCBF1	A	O		0			7	105			47	48		49		80	101	100	
RU4105	OWVTCBF1	O	B		90			7	104			52	51		50		79	102	103	
RU4051	OWVCBF	A	O		0			7				1	2	17	18		71	90	91	
RU4055	OWVCBF	O	B		90			7				37	38	39	40		72	93	92	
RU4061	OWVTCB	A	O		0			5				60	59	58	57		82			
RU4065	OWVTCB	O	B		90			5				53	54	55	56		81			
RU4085	OWTCBF	O	B		90			7				41	42	43	44		78	94	95	
RU4091	OVCBF	A	O		0			7				61	62	63	64		70	98	99	
RU4095	OVCBF	O	B	0	90			7				68	67	66	65		69	97	96	

TEST RUN NUMBERS

1 7 13 19 25 31 37 43 49 55 61 67 75 76

CLM ICN ICY CBL CYN CA CAF CAB CPC CPBI 10

→ IDPVAR(1) | IDPVAR(2) | NDV

COEFFICIENTS: SNTUNNEL SECTOR FOLLOWS ∅A SCHEDULE. ∅B VARY AS f(∅)

α or β SCHEDULES

∅A = -10, -8, -6, -4, -2, -1, 0, 1, 2, 4, 6, 8, 10

∅B = -10, -8, -6, -4, -2, -1, 0, 1, 2, 4, 6, 8, 10

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TABLE 1. (CONTINUED)

TEST TWT #502 DATA SET/RUN NUMBER

COLLATION SUMMARY

☐ PRETEST

☒ POSTTEST

DATA SET IDENTIFIER	CONFIGURATION	SCHD. α	SCHD. β	PARAMETERS/VALUES				NO. of RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE)											
									0.6	0.9	1.0	1.1	1.2	1.96	3.5	4.96				
RUN111	OWVTC	A	0	-	0			8	106	107	108	109	110	118	119	120				
RUN115	OWVTC	0	B	-	90			8	115	116	113	112	111	117	122	121				
RUN125	OWTC	0	B	-	90			1					116							

TEST RUN NUMBERS

1	7	13	19	25	31	37	43	49	55	61	67	75	76
CLM	CN	CY	CBL	CYN	CA	CAF	CAB	CPC	CABS				10

COEFFICIENTS: → IDPVAR(1) | IDPVAR(2) | NDV

α or β SCHEDULES

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TABLE 2: **TEST CONDITIONS**
TEST #502

MACH NUMBER	REYNOLDS NUMBER per unit length	DYNAMIC PRESSURE (pounds/sq. inch)	STAGNATION TEMPERATURE (degrees Fahrenheit)
0.60	5.0×10^6	4.3	100°F (Nominal)
0.70	5.5×10^6	5.5	
0.08	6.0×10^6	6.5	
0.09	6.3×10^6	7.4	
1.00	6.5×10^6	8.1	
1.10	6.6×10^6	8.7	
1.20	6.7×10^6	9.2	
1.46	7.5×10^6	10.8	
1.96	7.6×10^6	11.0	
3.5	7.1×10^6	6.8	
4.96	5.5×10^6	3.1	

BALANCE UTILIZED: MSFC Balance #200 & MSFC Balance #201

	CAPACITY: (#200)	CAPACITY: (#201)	COEFFICIENT TOLERANCE:
NF	175 lbs.	60 lbs.	
SF	150 lbs.	20 lbs.	
AF	100 lbs.	30 lbs.	
PM	185 in.-lbs.	120 in.-lbs.	
YM	160 in.-lbs.	40 in.-lbs.	
RM	50 in.-lbs.	25 in.-lbs.	

COMMENTS:

TABLE 3.
MODEL COMPONENT DESCRIPTIONS

MODEL COMPONENT: BODY - (O) ORBITER

GENERAL DESCRIPTION: 0.003366 SCALE GRUMMAN (H33) ORBITER

DRAWING NUMBER:

DIMENSIONS:	FULL SCALE	MODEL SCALE
Length	1618.2 in.	5.447 in.
Max. Width	299.5 in.	1.008 in.
Max. Depth	329.8 in.	1.110 in.
Fineness Ratio	5.4	5.4
Areas (Theoretical)		
Max. Cross-Sectional		
Planform	3120 ft^2	5.09 in^2
Wetted (Less Base)	10345 ft^2	16.877 in^2
Base	461 ft^2	0.7521 in^2

TABLE 3. (CONTINUED)

MODEL COMPONENT: BODY - S-IC BOOSTER (B)

GENERAL DESCRIPTION: SATURN V/S-IC BOOSTER

MODEL SCALE FACTOR 0.003366

DRAWING NUMBER:

DIMENSIONS:	FULL-SCALE	MODEL SCALE
Length	1452.76 in. 1515.45 in.	4.890 in. (1) 5.101 in. (2)
Max. Width Incl. Engine Fairings	562.20 in.	1.893 in.
Max. Depth Incl. Engine Fairings	562.20 in.	1.893 in.
Fineness Ratio	3.83	3.83
Body Diameter	33 ft.	1.333 in.
Max. Cross-Sectional Area	857.14 ft^2	1.396 in^2
Base Area	1332.38 ft^2	2.170 in^2
Cavity	694.43 ft^2	1.131 in^2
Solid Base	637.94 ft^2	1.039 in^2

(1) To end of booster.

(2) To end of engine fairing.

TABLE 3. (CONTINUED)

MODEL COMPONENT: WING (W)

GENERAL DESCRIPTION: CLIPPED DELTA WING FOR H-33 ORBITER (0.003366 SCALE)

DRAWING NUMBER:

DIMENSIONS:	FULL-SCALE	MODEL SCALE
TOTAL DATA		
Planform Area	4901 ft^2	7.996 in^2
Span (equivalent)	1158.64 in.	3.900 in.
Aspect Ratio	1.902	1.902
Rate of Taper		
Taper Ratio	0.165	0.165
Dihedral Angle, degrees	5°	5°
Incidence Angle, degrees	2°	2°
Aerodynamic Twist, degrees	-5°	-5°
Sweep Back Angles, degrees		
Leading Edge	55°	55°
Trailing Edge	-5°	-5°
Chords		
Root (Wing Sta. 0.0)	1036.84 in.	3.490 in.
Tip	170.83 in.	0.575 in.
Airfoil Section		
Root	t/c = 9.5% Camberred	t/c = 9.5% Camberred
Tip	t/c = 9.5% Camberred	t/c = 9.5% Camberred

TABLE 3. (CONTINUED)

MODEL COMPONENT: VERTICAL STABILIZER (V)

GENERAL DESCRIPTION: CENTERLINE VERTICAL STABILIZER FOR H-33 ORBITER

DRAWING NUMBER:

DIMENSIONS:	FULL SCALE	MODEL SCALE
EXPOSED DATA		
Area	855 ft^2	1.395 in^2
Span	406.1 in	1.367 in
Aspect Ratio	1.33	1.33
Taper Ratio	0.392	0.392
Chords		
Root	427.8 in.	1.44 in.
Tip	167.86 in.	0.565 in.
Sweep Back Angles, degrees		
Leading Edge	46.5°	46.5°
Trailing Edge (From Vertical)	21.5°	21.5°
Airfoil Section		
Root	NACA 64A010	NACA 64A010
Tip	NACA 64A010	NACA 64A010

TABLE 3. (CONTINUED)

MODEL COMPONENT: S-IC CRADLE (C)

GENERAL DESCRIPTION: H-33/S-IC CRADLE ASSEMBLY (0.003366 SCALE)

DRAWING NUMBER:

DIMENSIONS:	FULL SCALE	MODEL SCALE
Length	1568 in.	5.278 in.
Max. Width DIA	204.10 in.	0.687 in.
Max. Depth	204.10 in.	0.687 in.
Fineness Ratio	7.68	7.68
Max. Cross-Sectional Area	227.19 ft^2	0.0371 in^2

TABLE 3. (CONTINUED)

MODEL COMPONENT: DROP TANKS (T)

GENERAL DESCRIPTION: ORBITER EXTERNALLY MOUNTED DROP TANKS (0.003366 SCALE)

DRAWING NUMBER:

DIMENSIONS:	FULL-SCALE	MODEL SCALE
Length	1225.49 in.	4.125 in.
Max. Width DIA	178.55 in.	0.601 in.
Max. Depth	178.55 in.	0.601 in.
Fineness Ratio	6.875	6.875

TABLE 3. (CONCLUDED)

MODEL COMPONENT: S-IC FIN (F)

GENERAL DESCRIPTION: 75 SQUARE FOOT S-IC FIN

FOUR USED, EACH ORIENTED ±45° OF HORIZONTAL REFERENCE PLANE

SCALE FACTOR 0.003366

DRAWING NUMBER:

DIMENSIONS (EXPOSED):	FULL-SCALE	MODEL SCALE
Area (Single Panel)	75.0 ft^2	0.850 in^2
Semi-Span (Max.)	139.274 in	0.469 in
Root Chord	135.410 in	0.456 in
Tip Chord	55.000 in.	0.185 in.
Taper Ratio	0.406	0.406
Aspect Ratio (Single Panel)	1.796	1.796
Sweep Back Angles, degrees		
Leading Edge	30°	30°
Trailing Edge	0°	0°
Trailing Edge Thickness		
At Root	13.512 in	0.045 in.
At Tip	4.000 in.	0.013 in.

TABLE 4. - INDEX OF MODEL FIGURES

FIGURE NUMBER		PAGE NUMBER
1.	Axis System	28
2.	S-IC/H-33 Grumman Orbiter	29
3.	H-33 Grumman Orbiter With S-IC Cradle	30
4.	Booster and Orbiter Plus Cradle Base Pressure Locations	31
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6.	Grumman H-33 Orbiter Wing	33
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8.	Grumman H-33 Orbiter/S-IC Cradle Assembly	35
9.	S-IC Engine Shroud and 75 Sq. Ft. Fin	36
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11.	Photograph of Model Installed in MSFC 14" TWT (3/4 Side View)	38
12.	MSFC 14" TWT Installation Photograph	39

TABLE 5, INDEX OF DATA FIGURES

TITLE	PLOTTED COEFFICIENTS SCHEDULE	CONDITIONS VARYING	PAGES
S-IC Grumman H-33 Drop Tank Orbiter Longitudinal Stability	A	Mach Number	1-90
S-IC Grumman H-33 Drop Tank Orbiter Quartering Wind Alpha Data	A	Roll Angle	91-120
S-IC/Grumman H-33 Drop Tank Orbiter Quartering Wind Beta Data	B	Roll Angle	121-155
S-IC/Grumman H-33 Drop Tank Orbiter Quartering Wind Beta Data	C	Roll Angle	156-160
S-IC/Grumman H-33 Drop Tank Orbiter Lateral Directional Stability	B	Mach Number	161-258
S-IC/Grumman H-33 Drop Tank Orbiter Longitudinal Stability Alpha or CN = 0.0	D	Configuration	259-318
S-IC/Grumman H-33 Drop Tank Orbiter Lateral Stability Beta = 0.0	E	Configuration	319-346
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Incidence Angle	F	Wing Incidence	347-352
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Incidence	G	Mach Number	353-356
Effect of Tanks on Orbiter Incidence	G	Mach Number	357-364
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster	H	Mach Number	365-372

TABLE 5 (CONTINUED)

TITLE	PLOTTED COEFFICIENTS SCHEDULE	CONDITIONS VARYING	PAGES
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster	I	Mach Number	373-382
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster Fin Orientation	H	Mach Number	383-390
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster Fin Orientation	I	Mach Number	391-400
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Drop Tanks	H	Mach Number	401-408
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Drop Tanks	I	Mach Number	409-418
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster Fins	H	Mach Number	419-422
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster Fins	I	Mach Number	423-427
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Wing	H	Mach Number	428-435
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Wing	I	Mach Number	436-445
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Vertical Tail	I	Mach Number	446-455
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Vertical Tail	I	Mach Number	456-460
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster	J	Configuration	461-466

25

TABLE 5 (CONTINUED)

TITLE	PLOTTED COEFFICIENTS SCHEDULE	CONDITIONS VARYING	PAGES
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster	K	Configuration	467-469
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster Fin Orientation	J	Configuration	470-475
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster Fin Orientation	K	Configuration	476-478
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Drop Tanks	J	Configuration	479-484
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Drop Tanks	K	Configuration	485-487
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster Fins	J	Configuration	488-493
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster Fins	K	Configuration	494-496
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Wing	J	Configuration	497-502
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Wing	K	Configuration	503-505
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Vertical Tail	K	Configuration	506-508

TABLE 5 (CONTINUED)

PLOTTED COEFFICIENTS SCHEDULE:

A

CN vs. α
CIM vs. α
CA vs. α
CAF vs. α
CAB vs. α
DCIM/DCN vs. α

B

CY vs. β
CYN vs. β
CBL vs. β
CA vs. β
CAF vs. β
CAB vs. β
DCYN/DCY vs. β

C

β vs. α

D

CP/D vs. M
CNAFO vs. M
CIMAFO vs. M
CNAAFO vs. M
CMAAFO vs. M
CAAFO vs. M
CAFAFO vs. M
CABAFO vs. M
ALFCNO vs. M
CIMCNO vs. M

E

YCP/D vs. M
DCY/DBETA vs. M
DCYN/DBETA vs. M
DCBL/DBETA vs. M

F

CIMAFO vs. M
CNAFO vs. M
CIMCNO vs. M
CAAFO vs. M
ALFCNO vs. M
CP/D vs. M

G

CNAFO vs. WNGINC
CIMAFO vs. WNGINC
CAAFO vs. WNGINC
CIMCNO vs. WNGINC

H

DCN vs. α
DCIM vs. α
DCA vs. α
DCAF vs. α

I

DCY vs. β
DCYN vs. β
DCBL vs. β
DCA vs. β
DCAF vs. β

J

DCN(ALPHA=0) vs. M
DCIM(ALPHA=0) vs. M
DCA(ALPHA=0) vs. M
DCAF(ALPHA=0) vs. M
DCNA(ALPHA=0) vs. M
DCIMA(ALPHA=0) vs. M

K

DCYB vs. M
DCYNB vs. M
DCBLB vs. M

Notes:

1. Positive directions of force coefficients moment coefficients, and angles are indicated by arrows.

2. For clarity, origins of wind and stability axes have been displaced from the center of gravity.

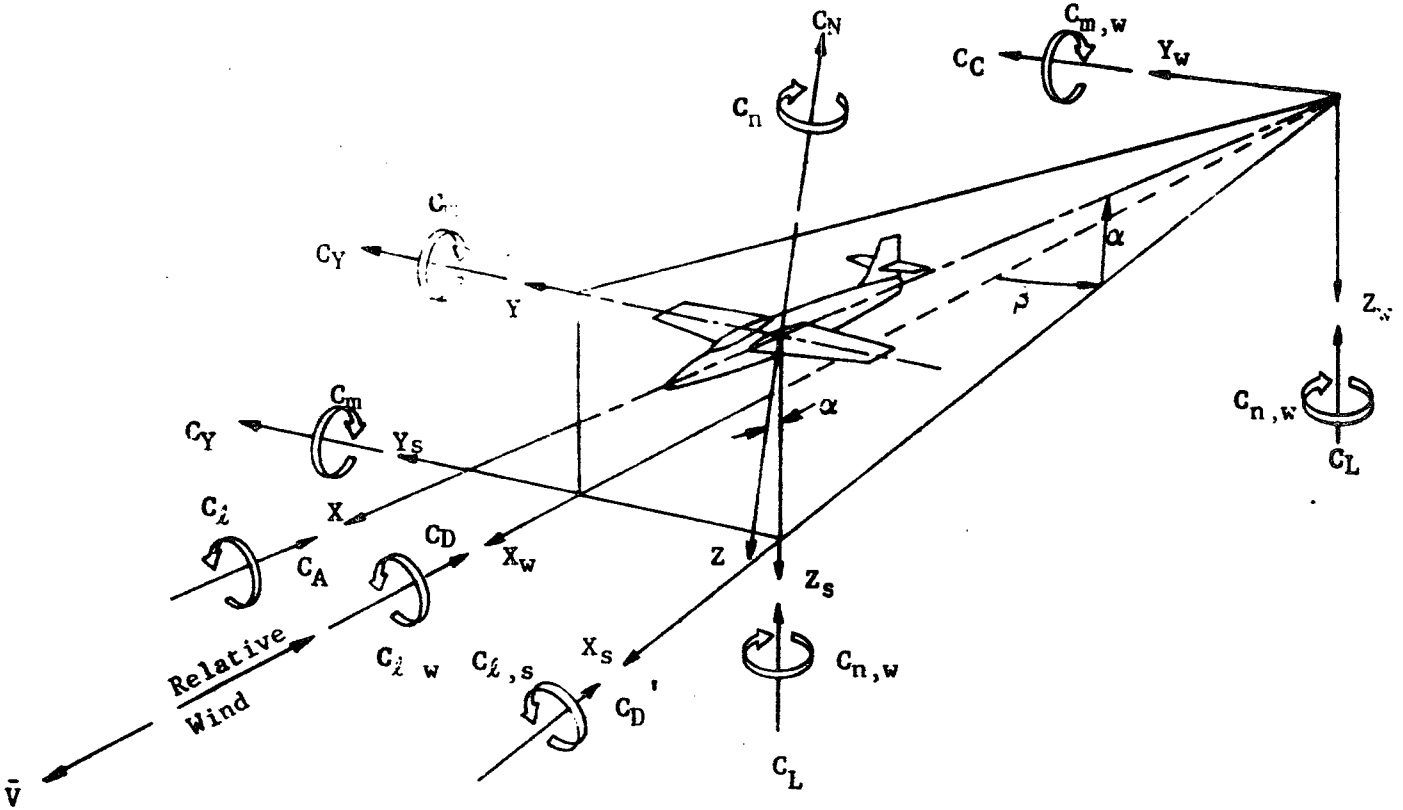


Figure 1. Axis systems, showing direction and sense of force and moment coefficients, angle of attack, and sideslip angle

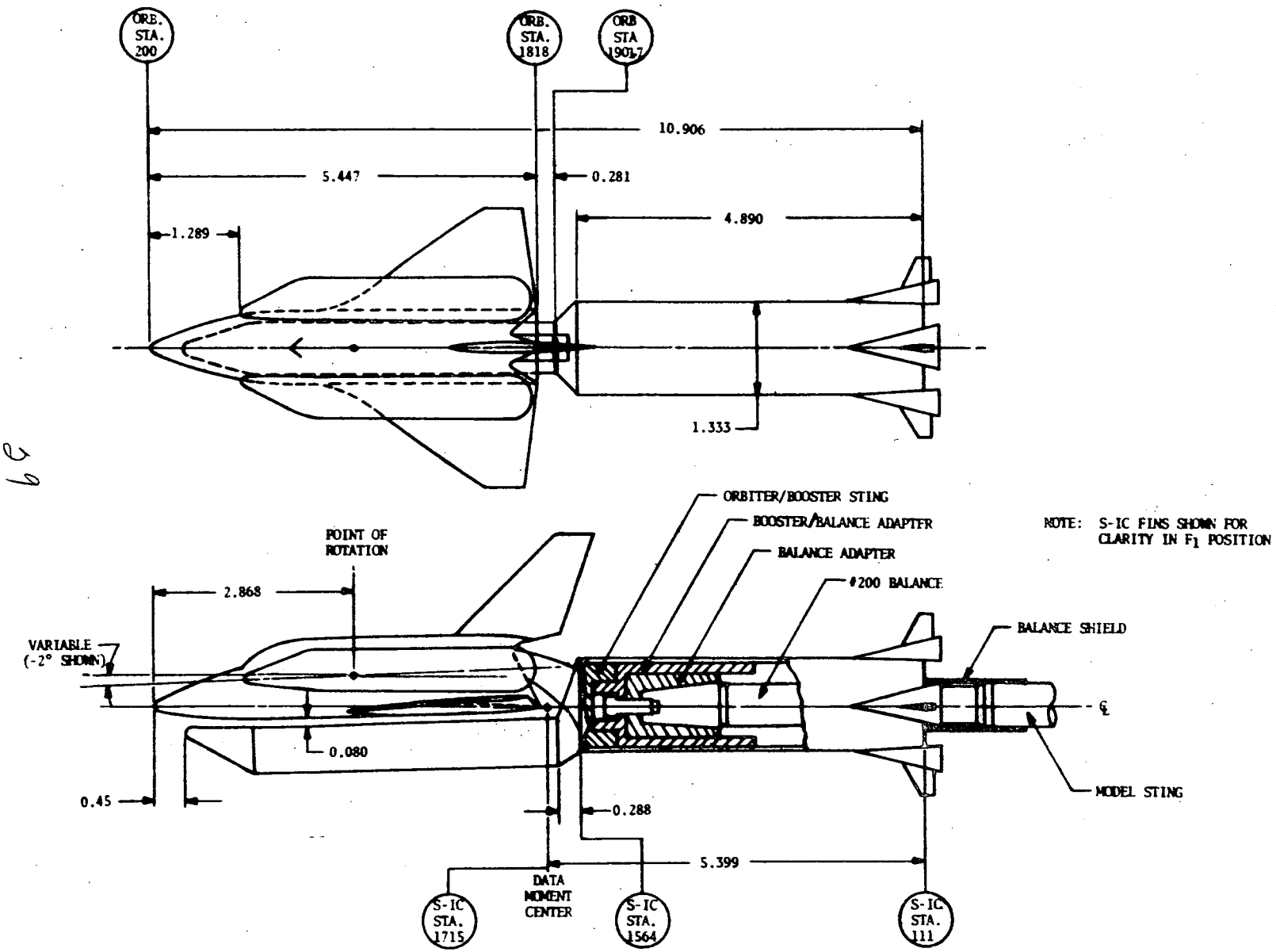


Figure 2. S-IC/H-33 Grumman Orbiter

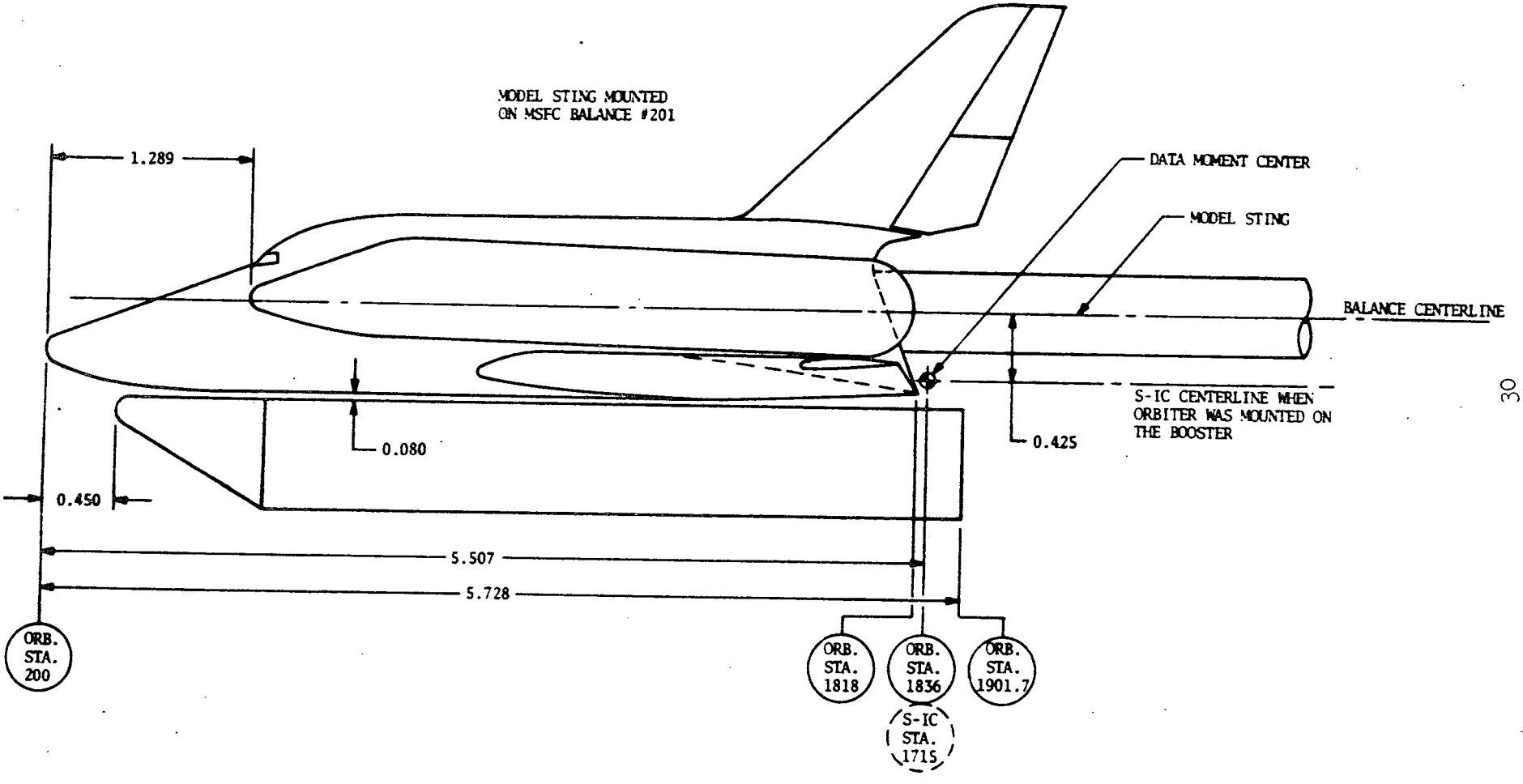
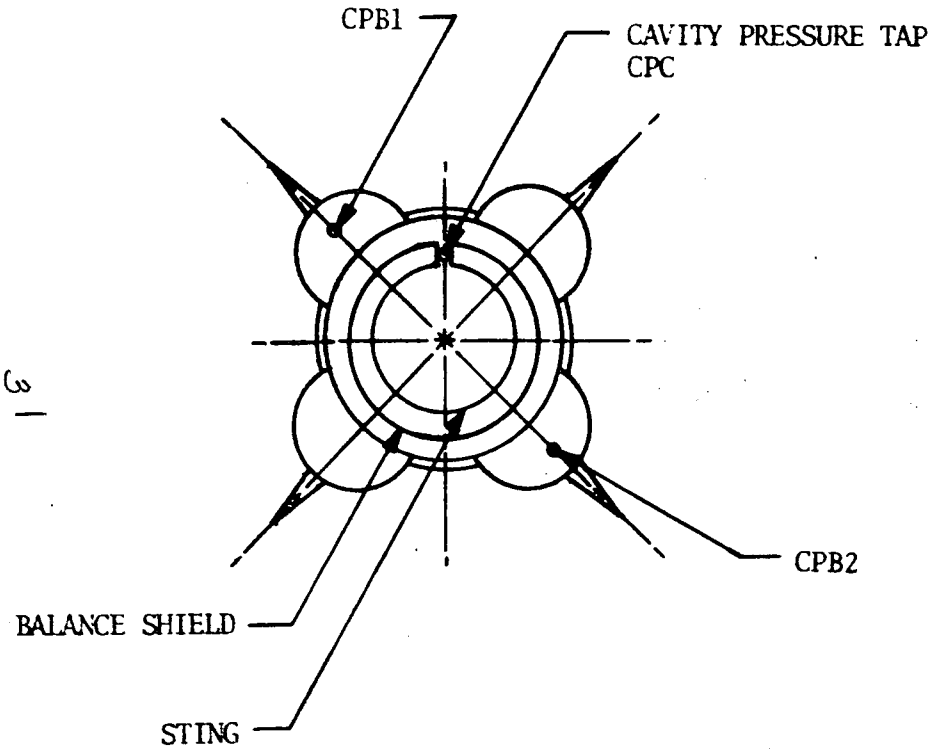
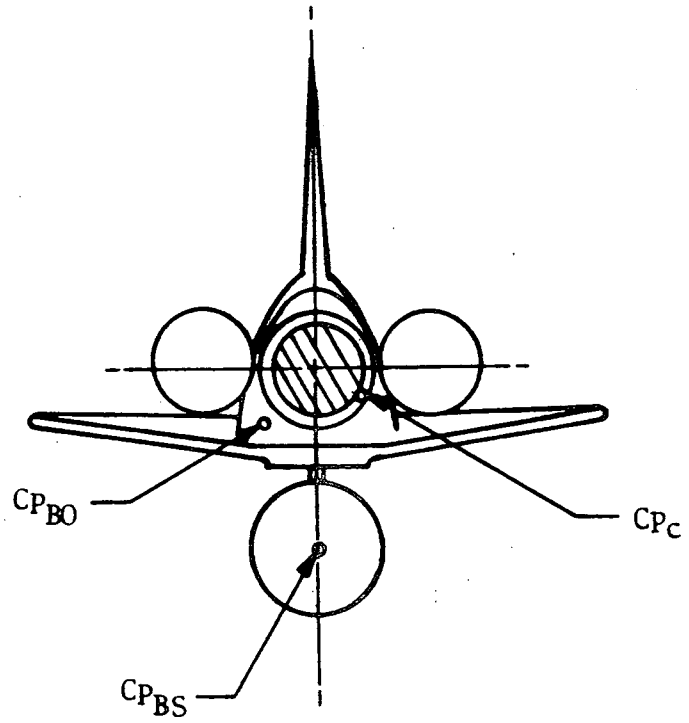


FIGURE 3. H-33 GRUMMAN ORBITER WITH S-IC CRADLE



BOOSTER BASE PRESSURE LOCATIONS



ORBITER + CRADLE BASE PRESSURE LOCATIONS

Figure 4. Booster and Orbiter Plus Cradle Base Pressure Locations

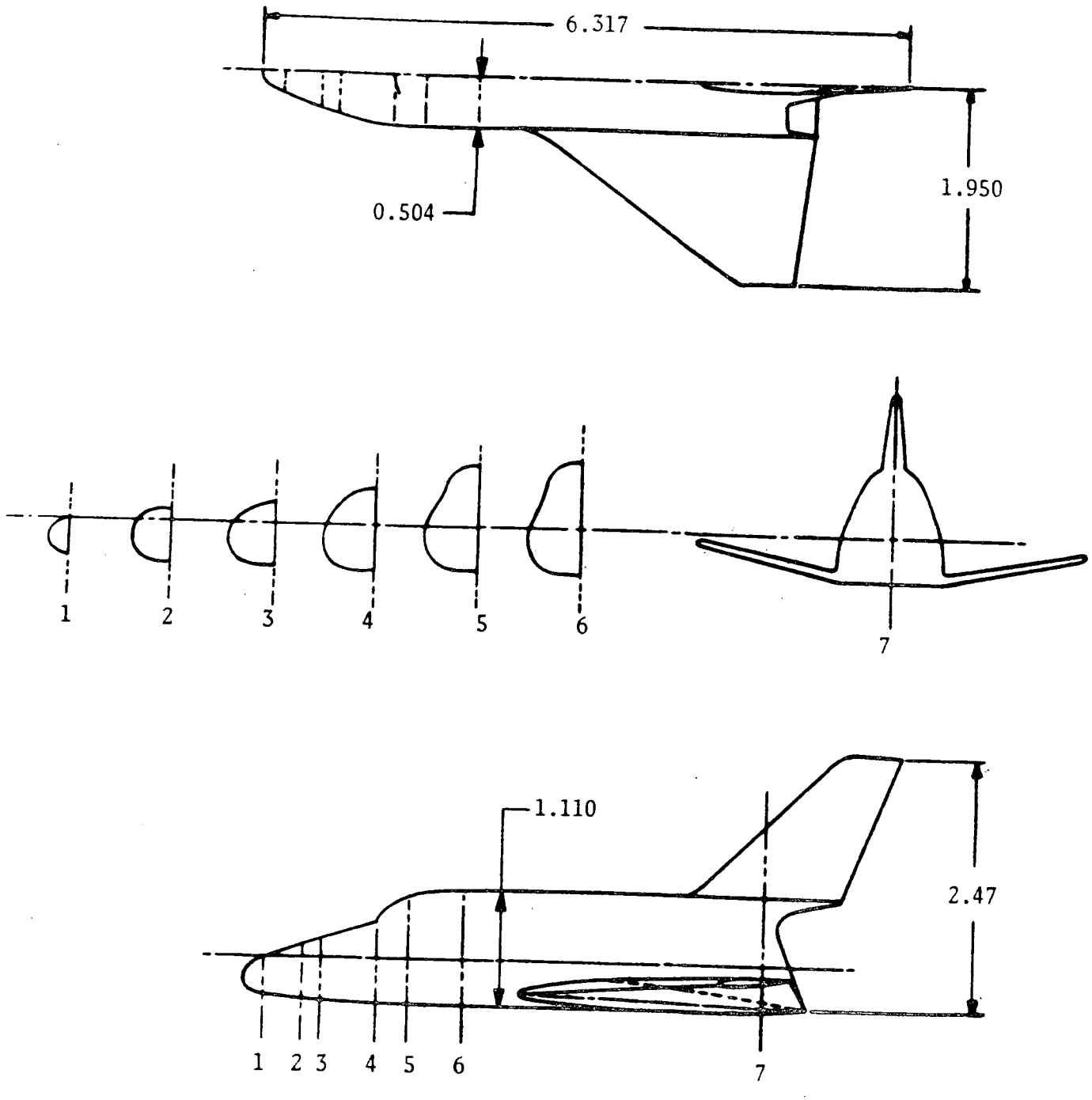


Figure 5. Orbiter Body Model Component (O)

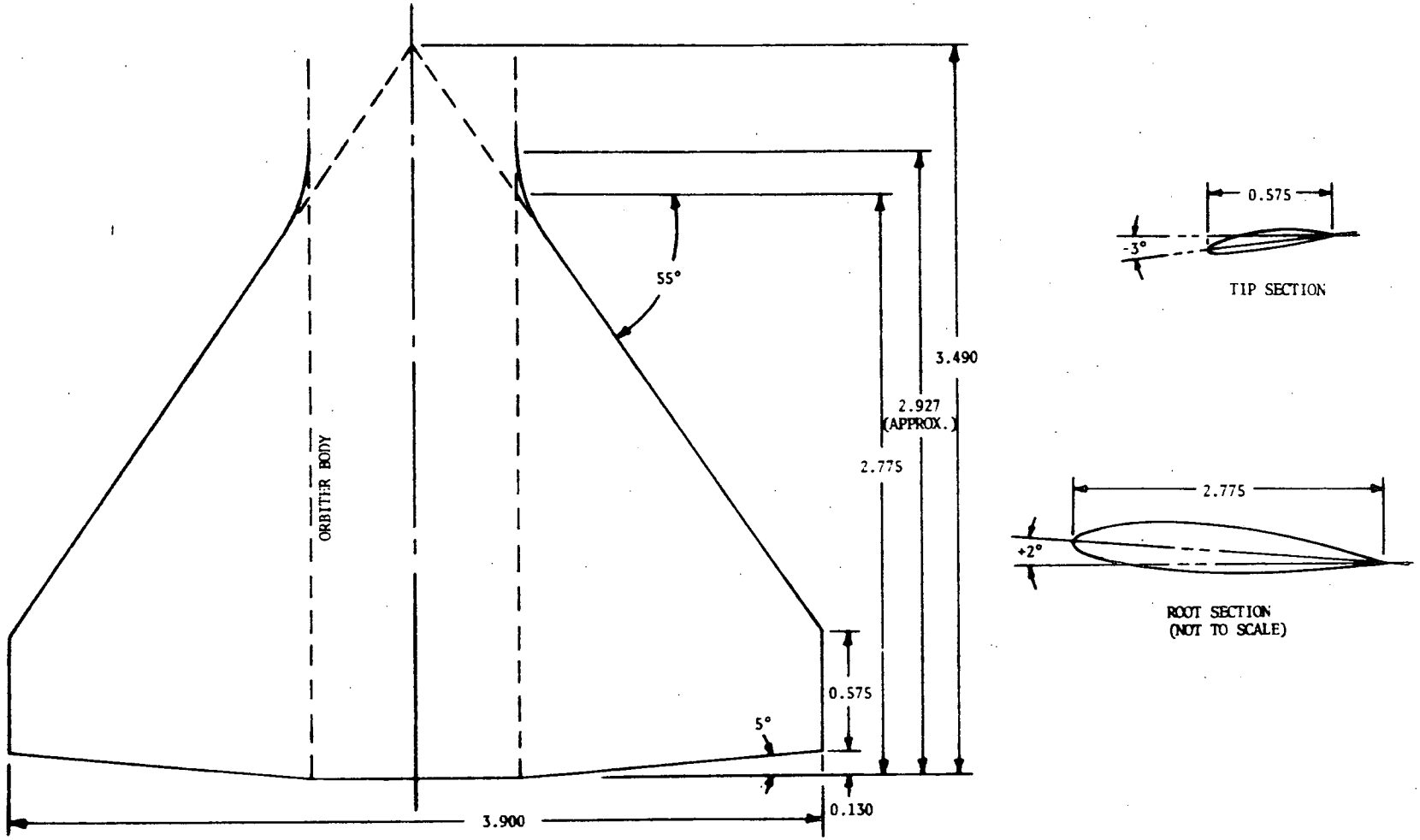


Figure 6. Grumman H-33 Orbiter Wing

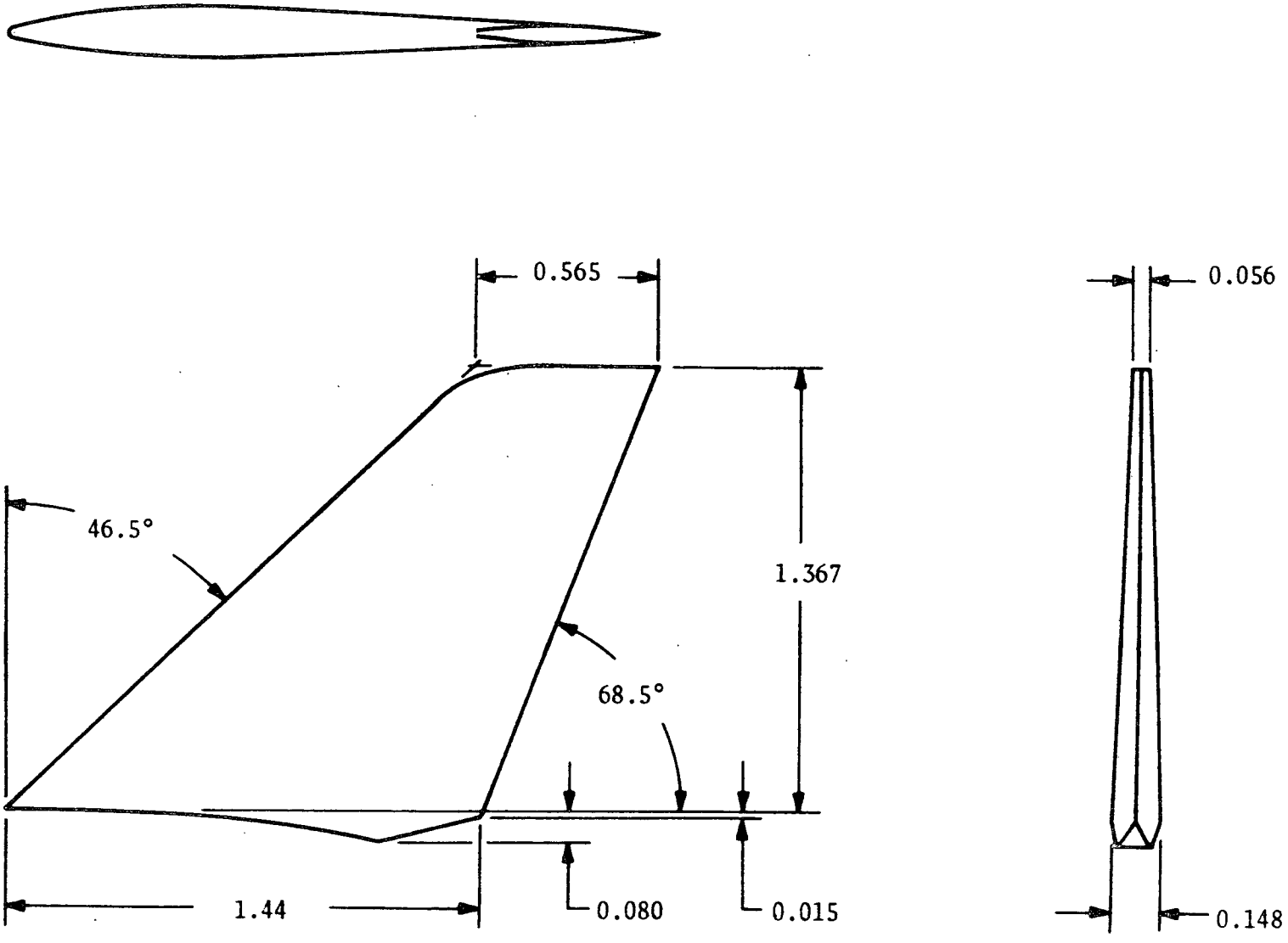


FIGURE 7. GRUMMAN H-33 ORBITER VERTICAL TAIL

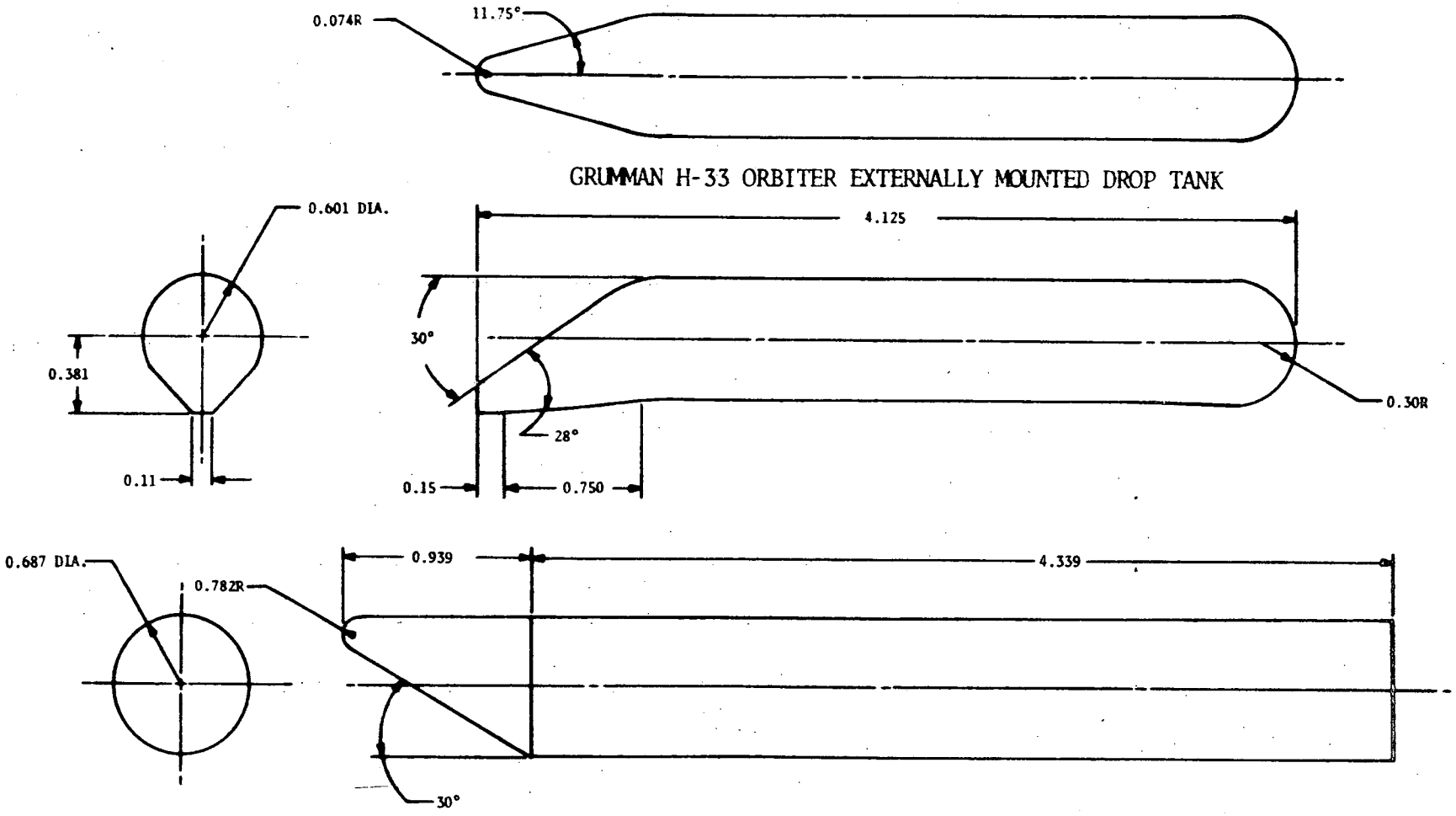
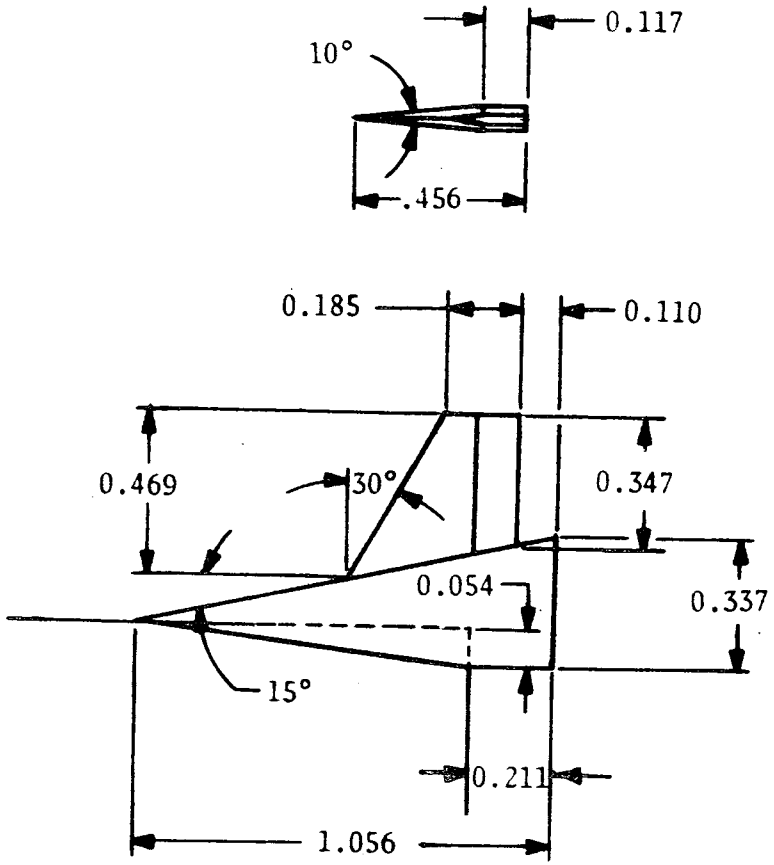


Figure 8. Grumman H-33 Orbiter/S-IC Cradle Assembly

35



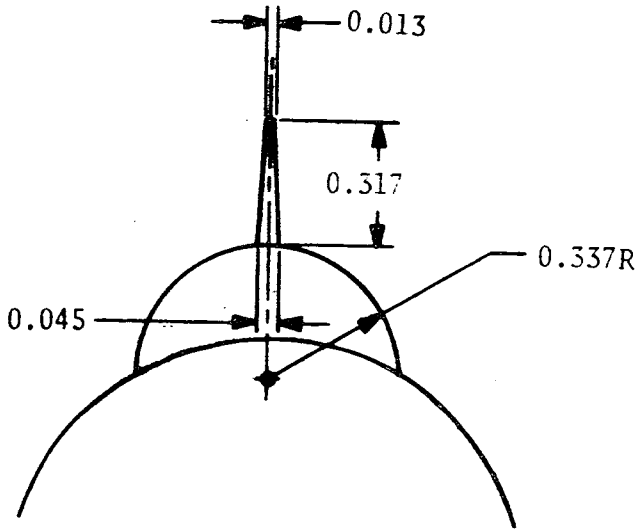


FIGURE 9. S-IC ENGINE SHROUD AND 75 SQ. FT. FIN

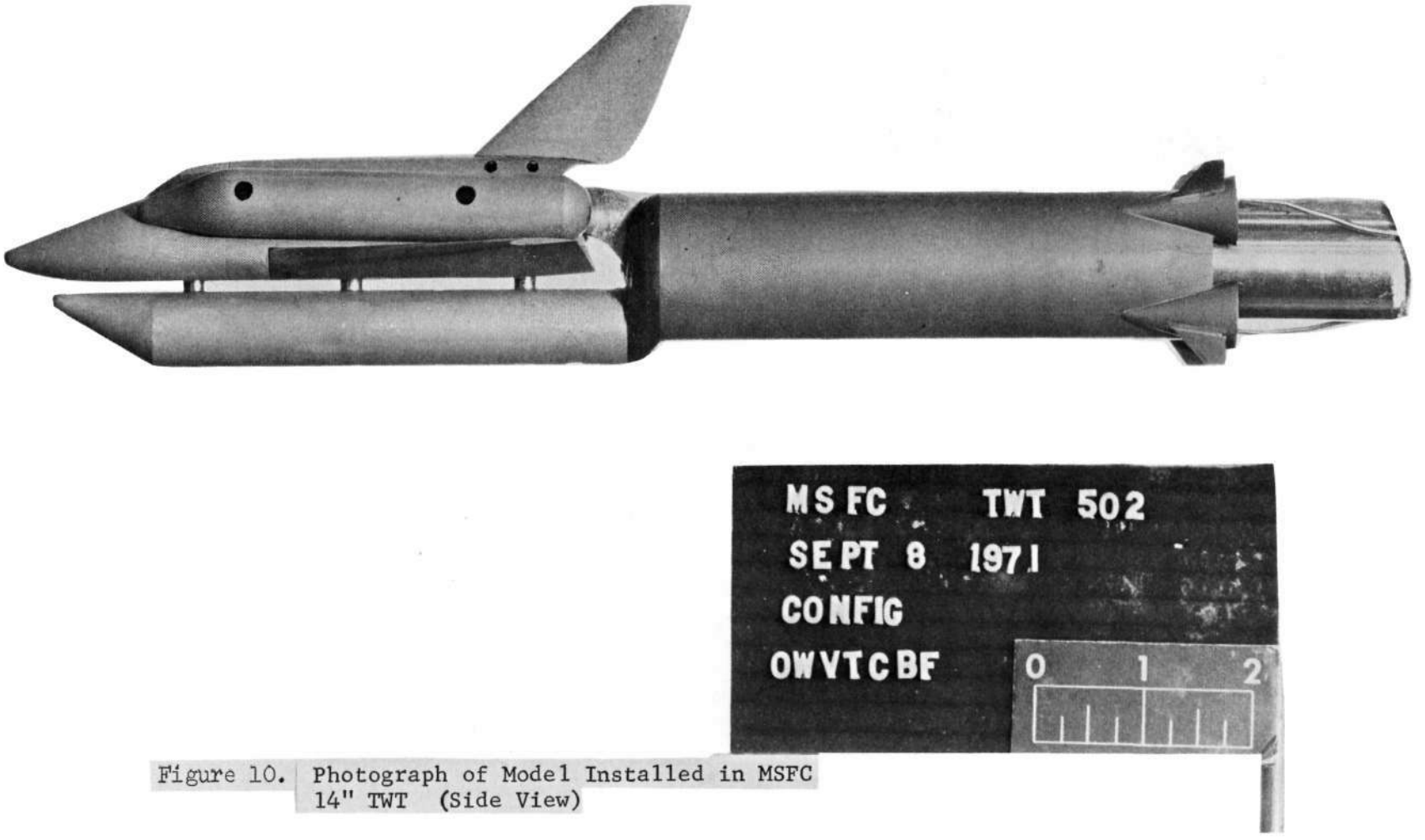


Figure 10. Photograph of Model Installed in MSFC 14" TWT (Side View)

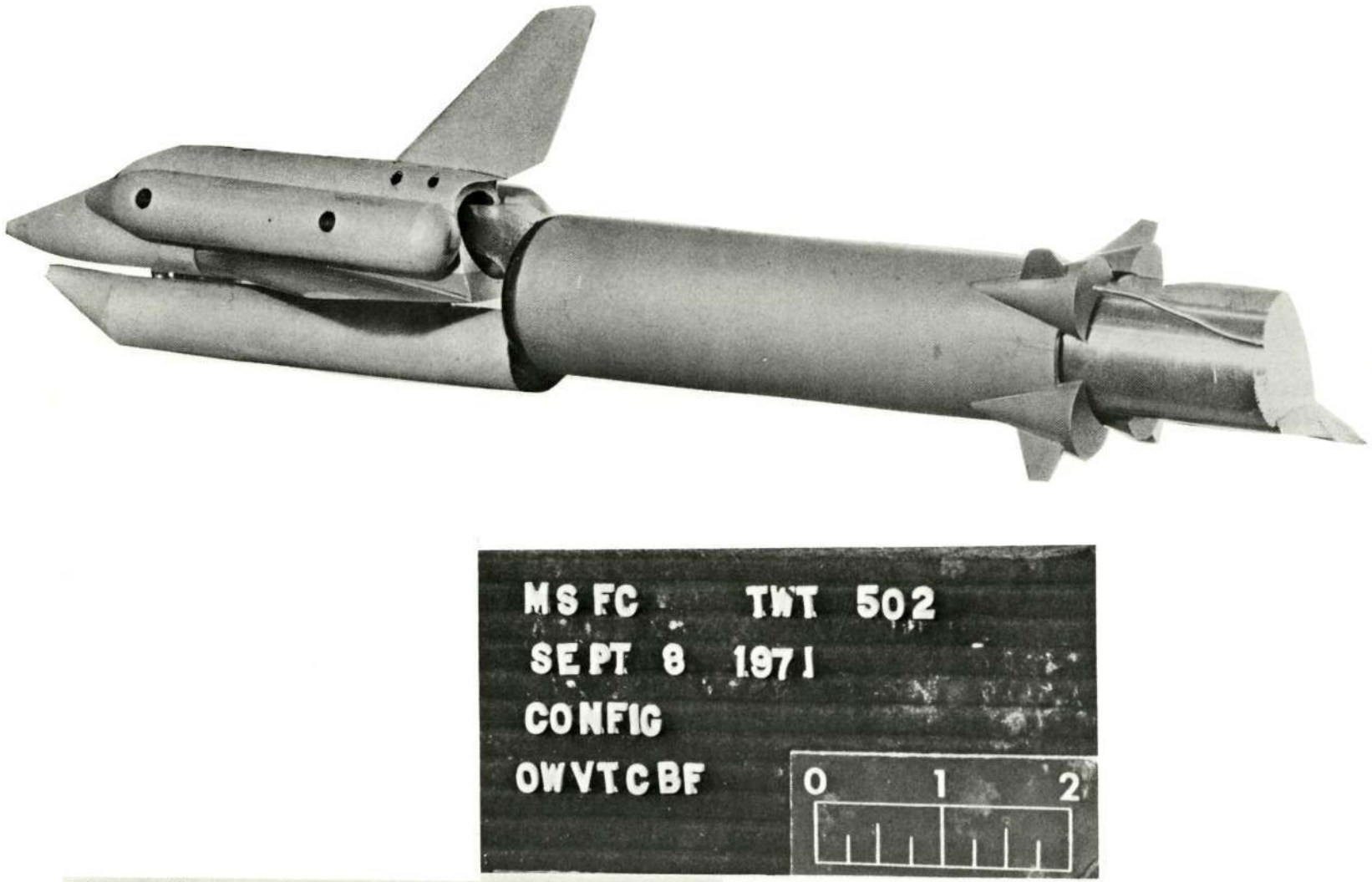
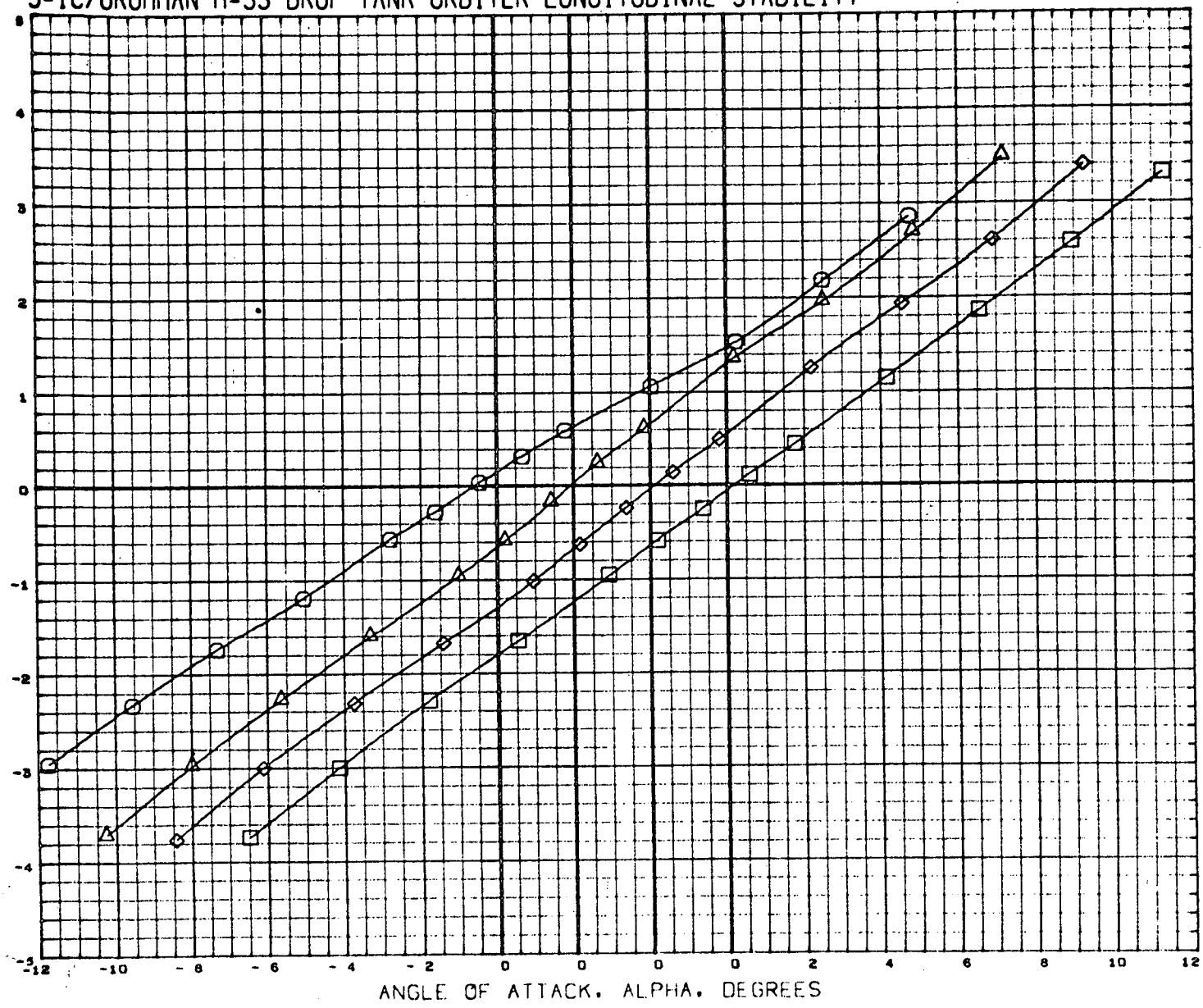


Figure 11. Photograph of Model Installed in MSFC 14" TWT (3/4 Side View)

Figure 12. MSFC 14" TWT Installation Photograph

D A T A F I G U R E S

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



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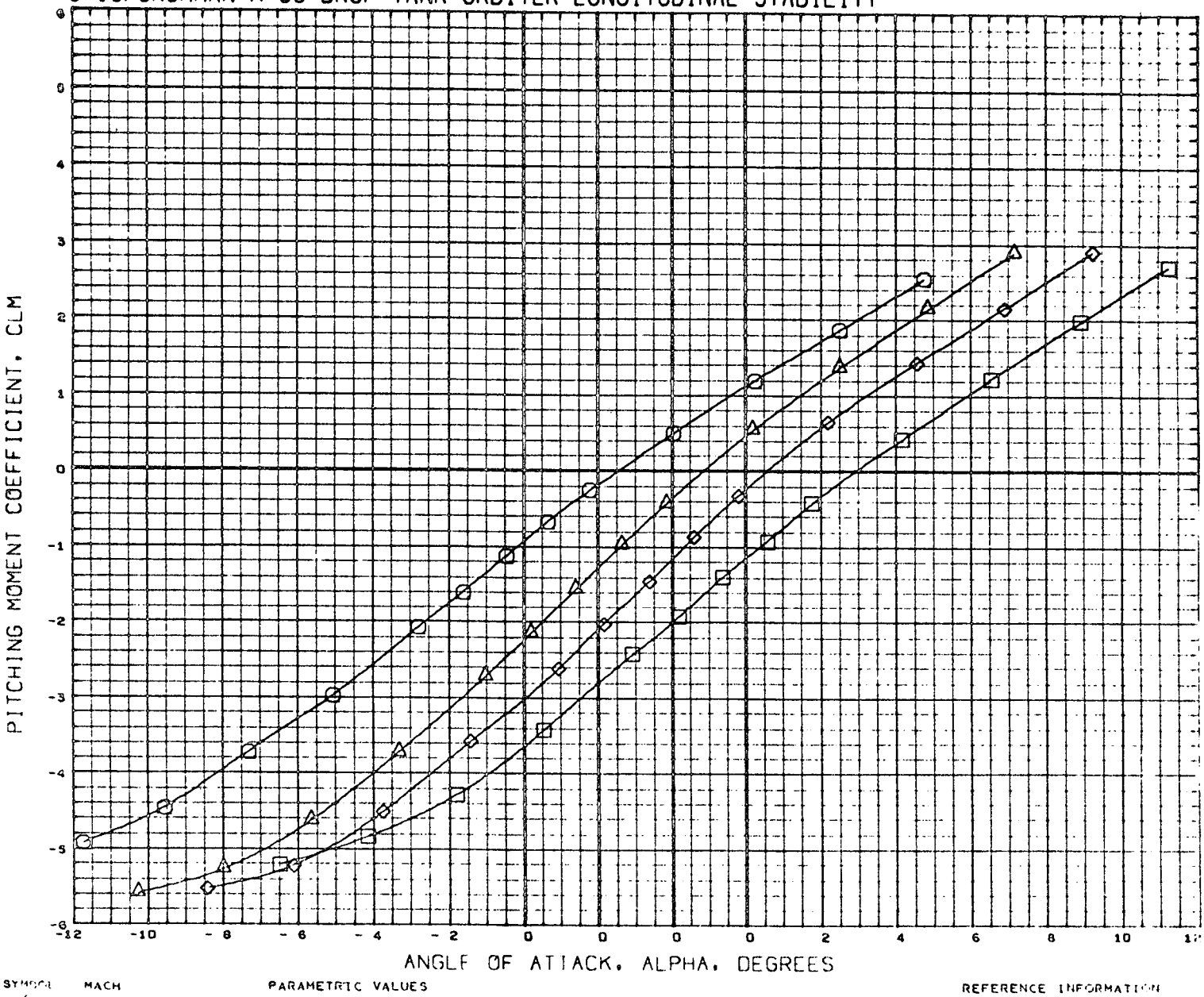
S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



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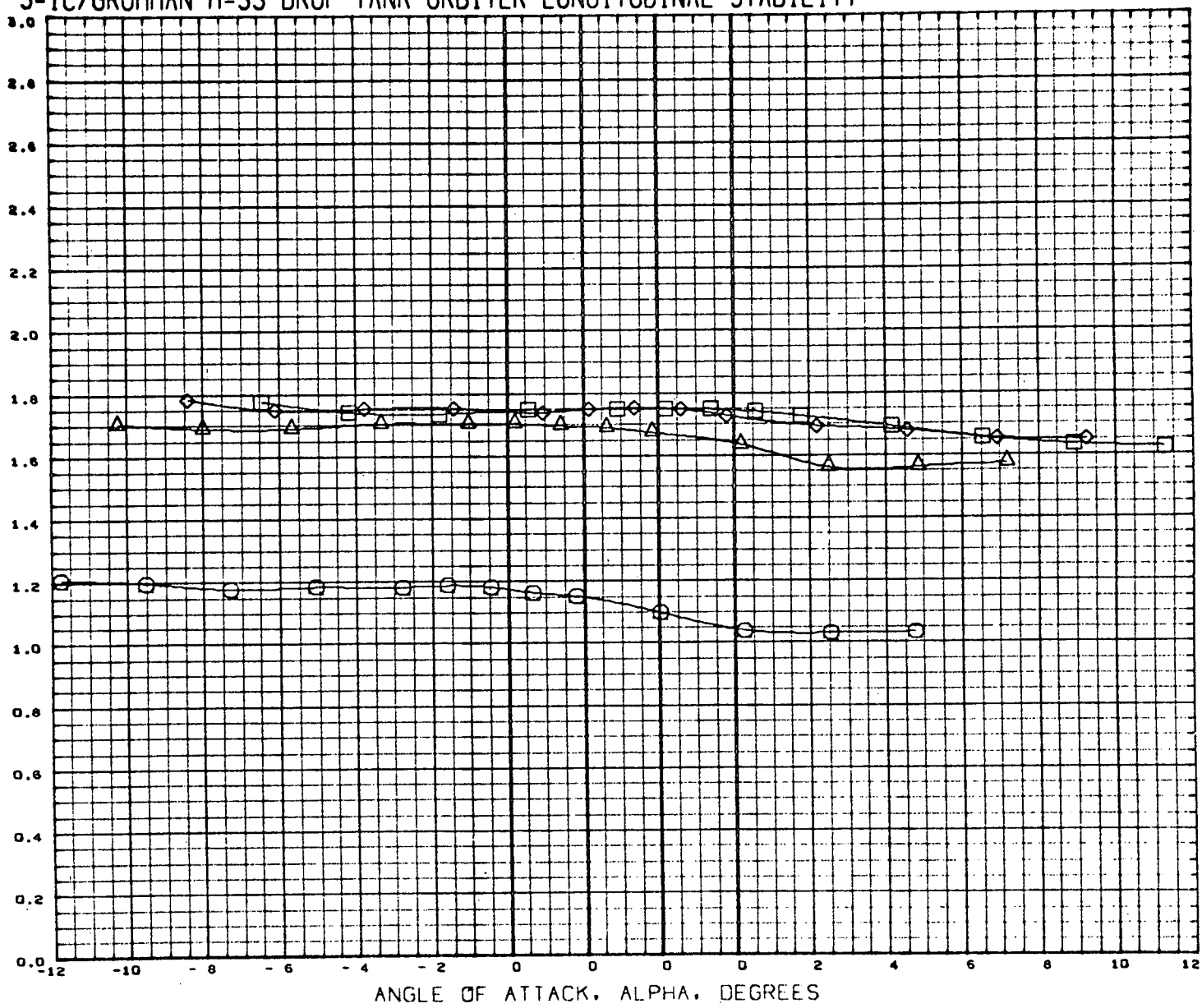
S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



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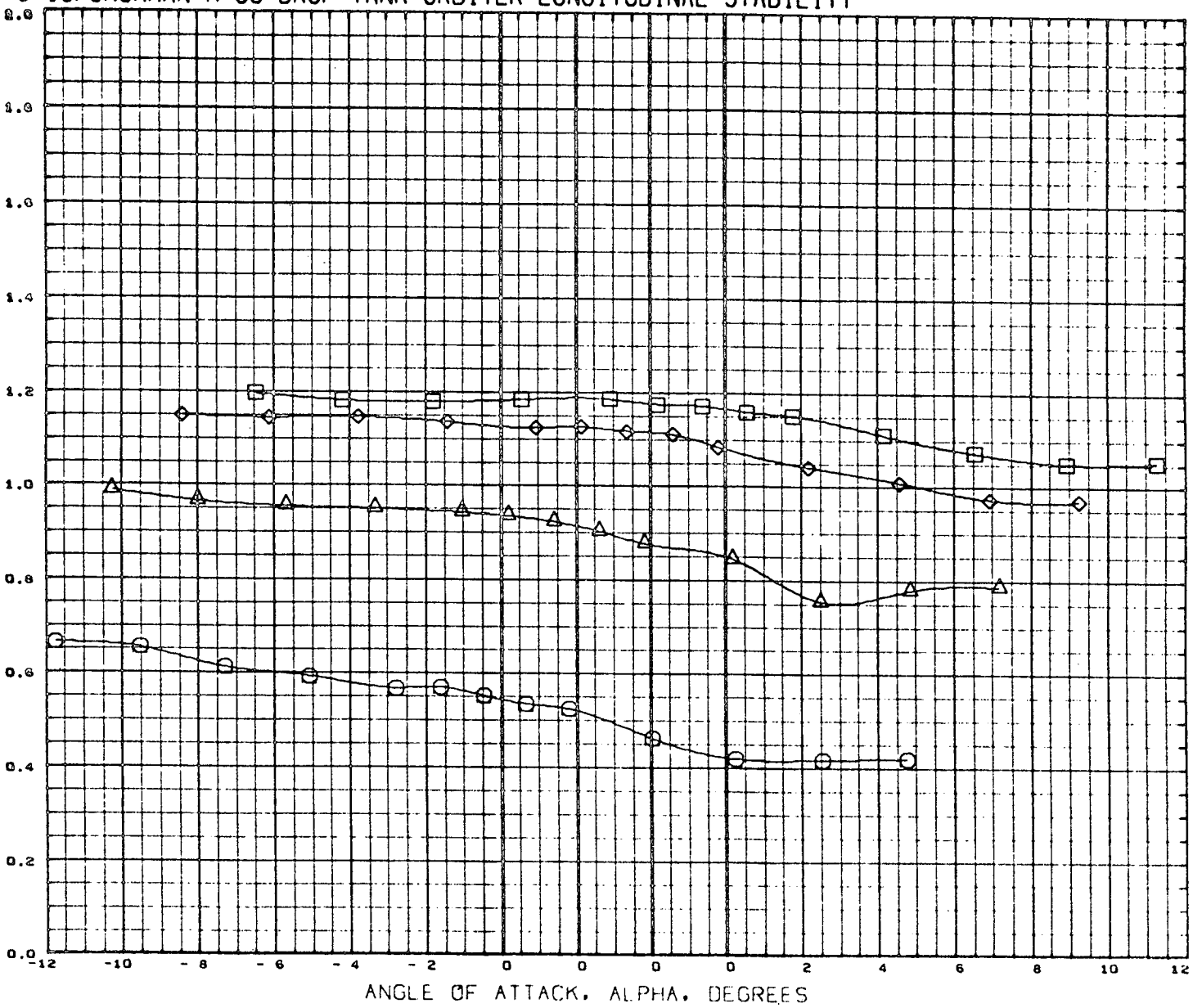
S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



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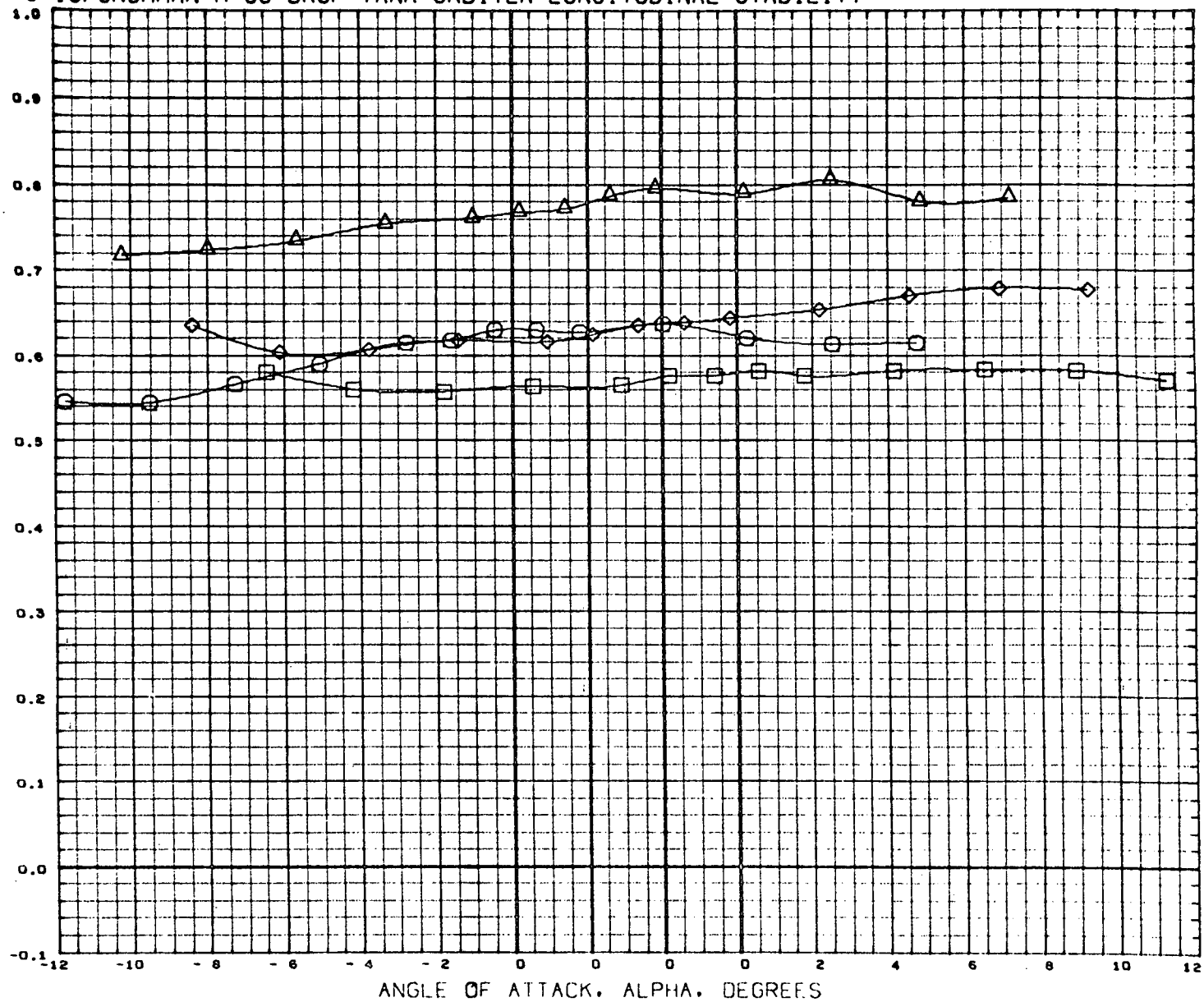
S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



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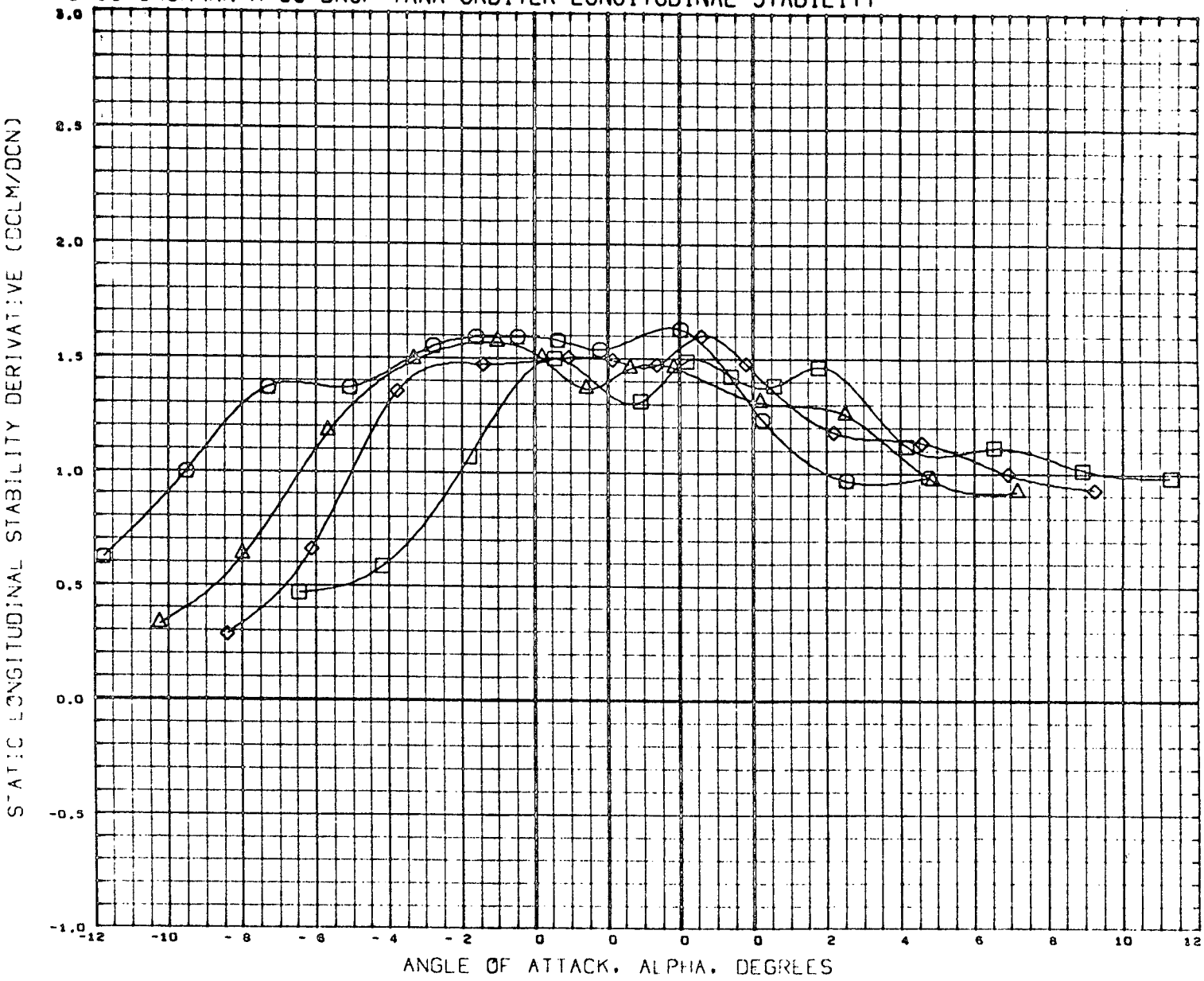
S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



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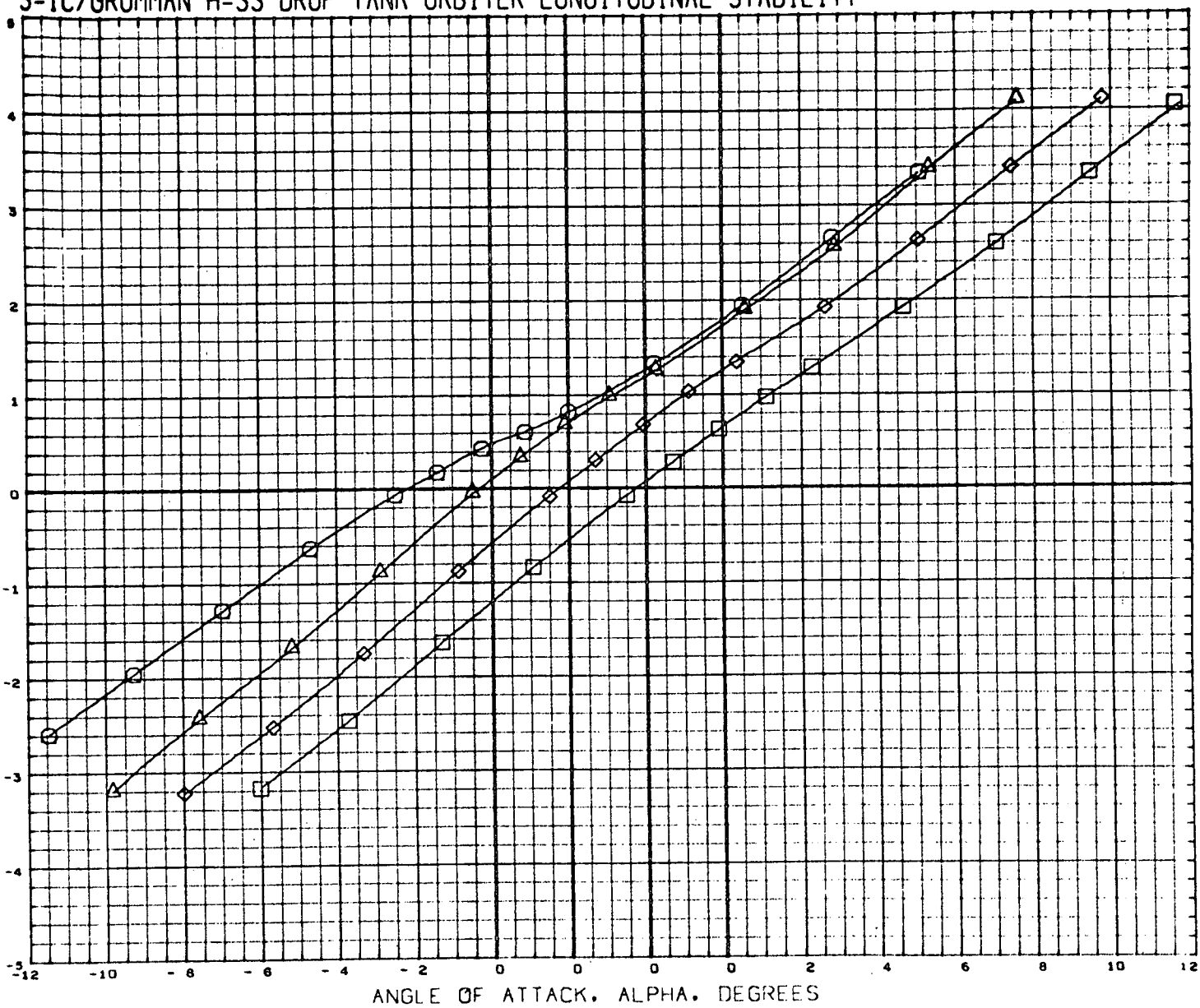
S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



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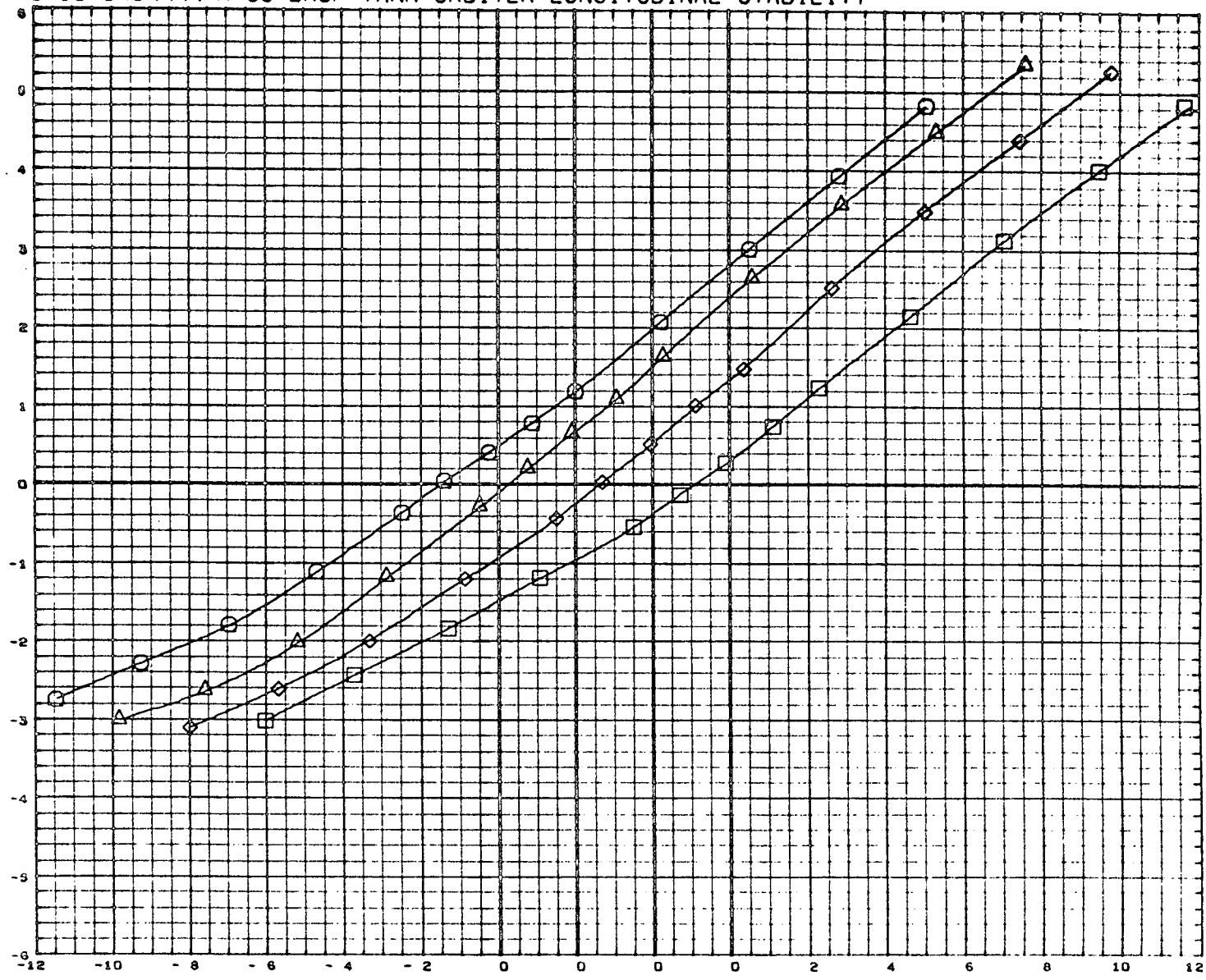
S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



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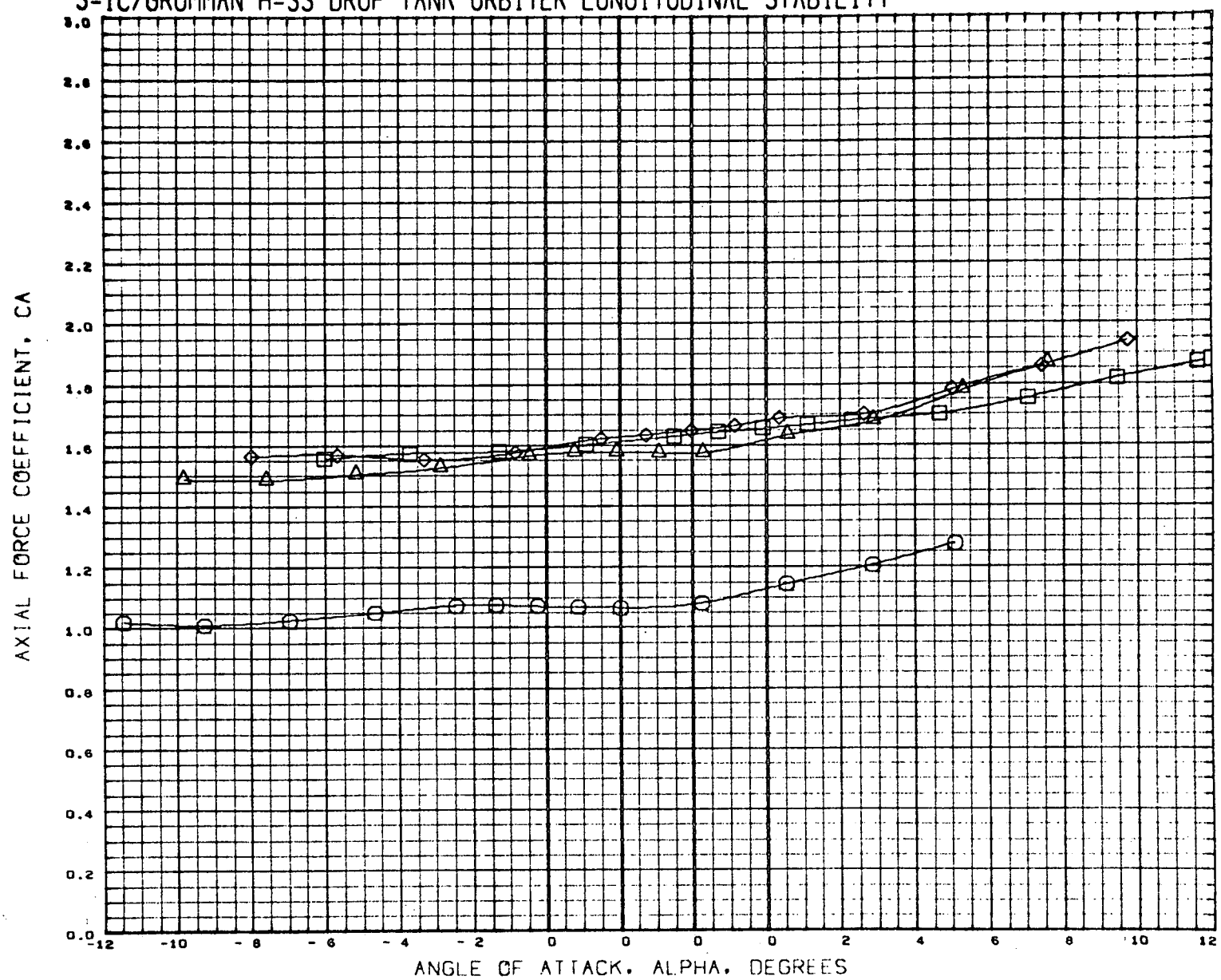

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□	1.199

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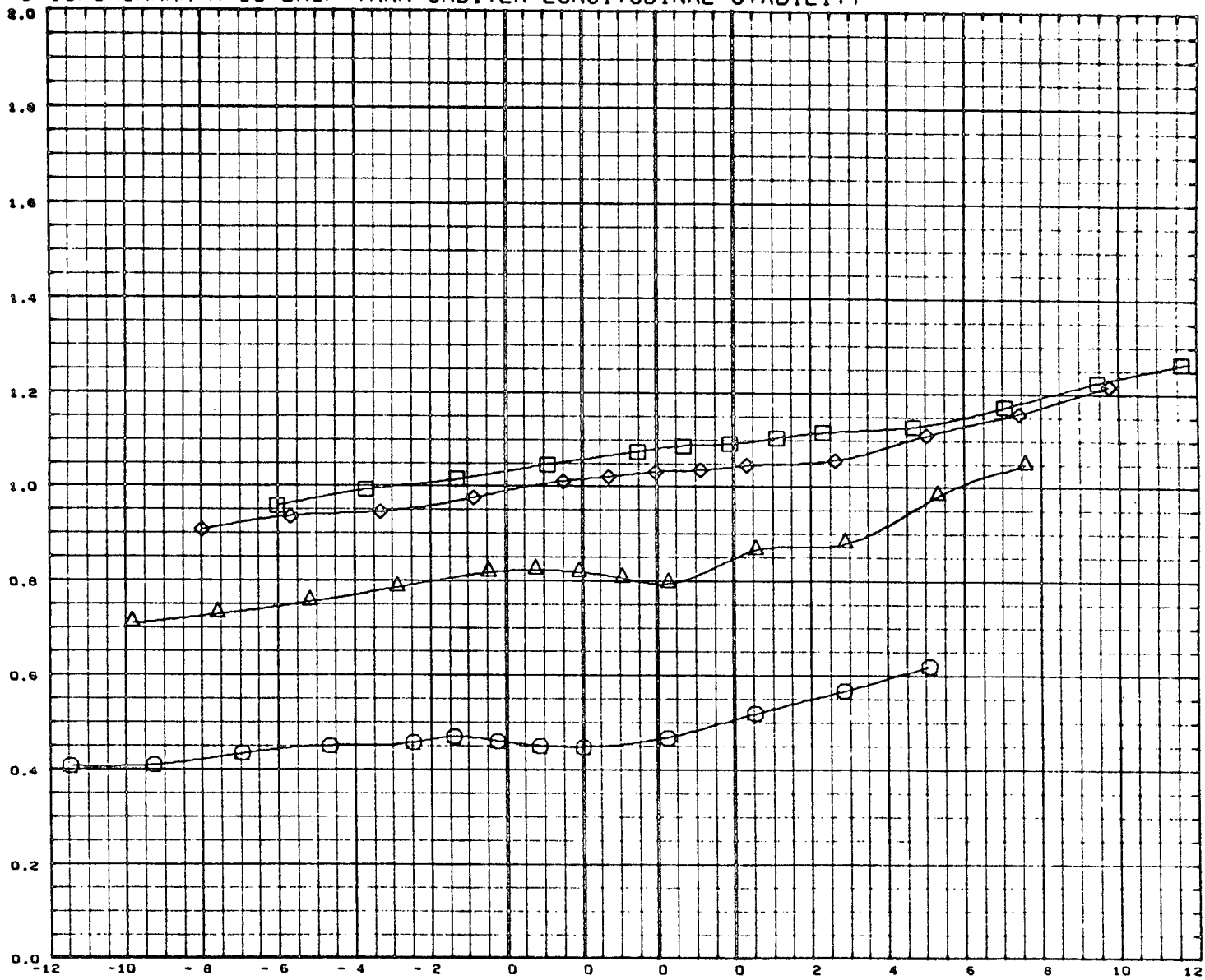

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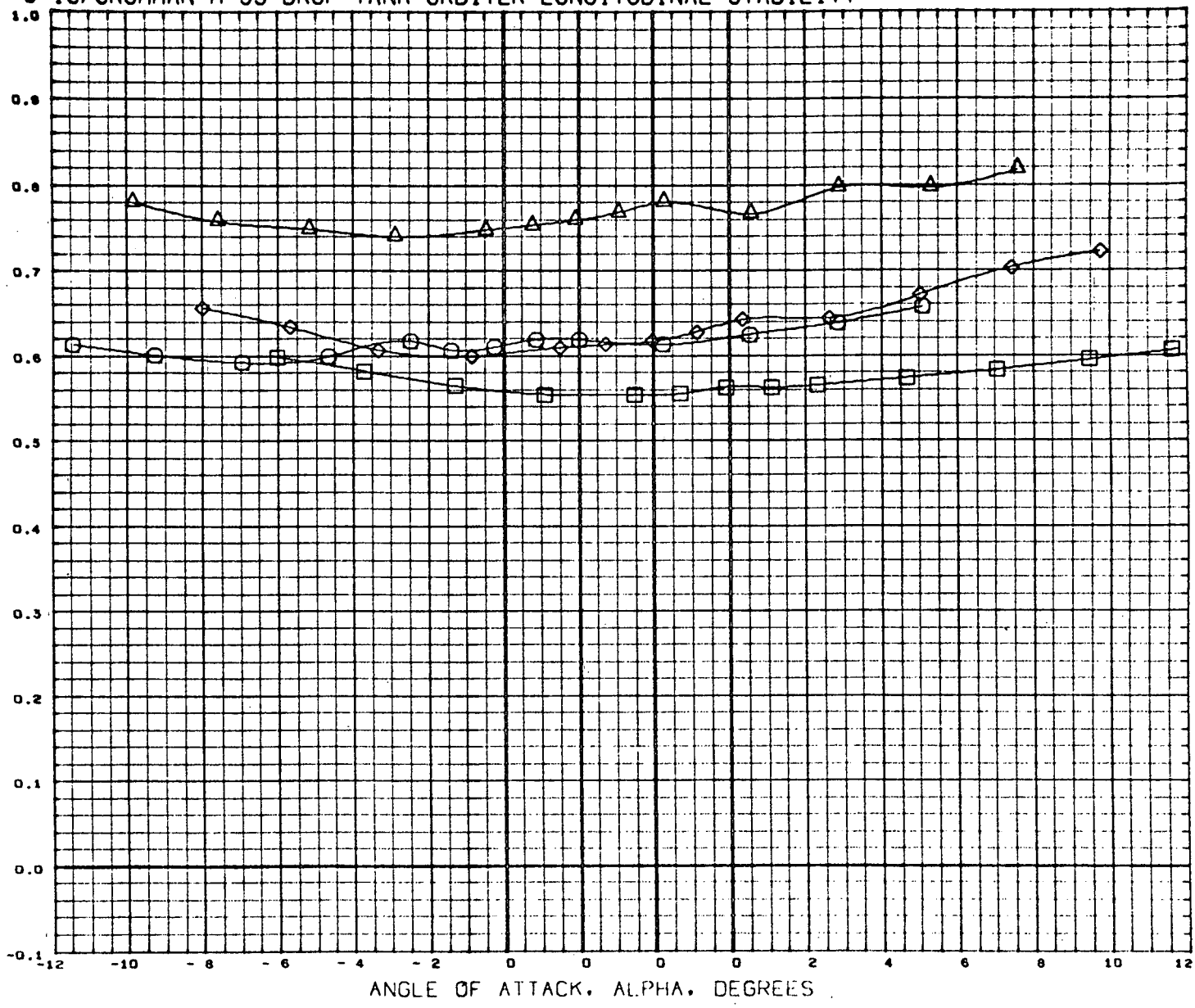

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◇	1.097				
□	1.199				

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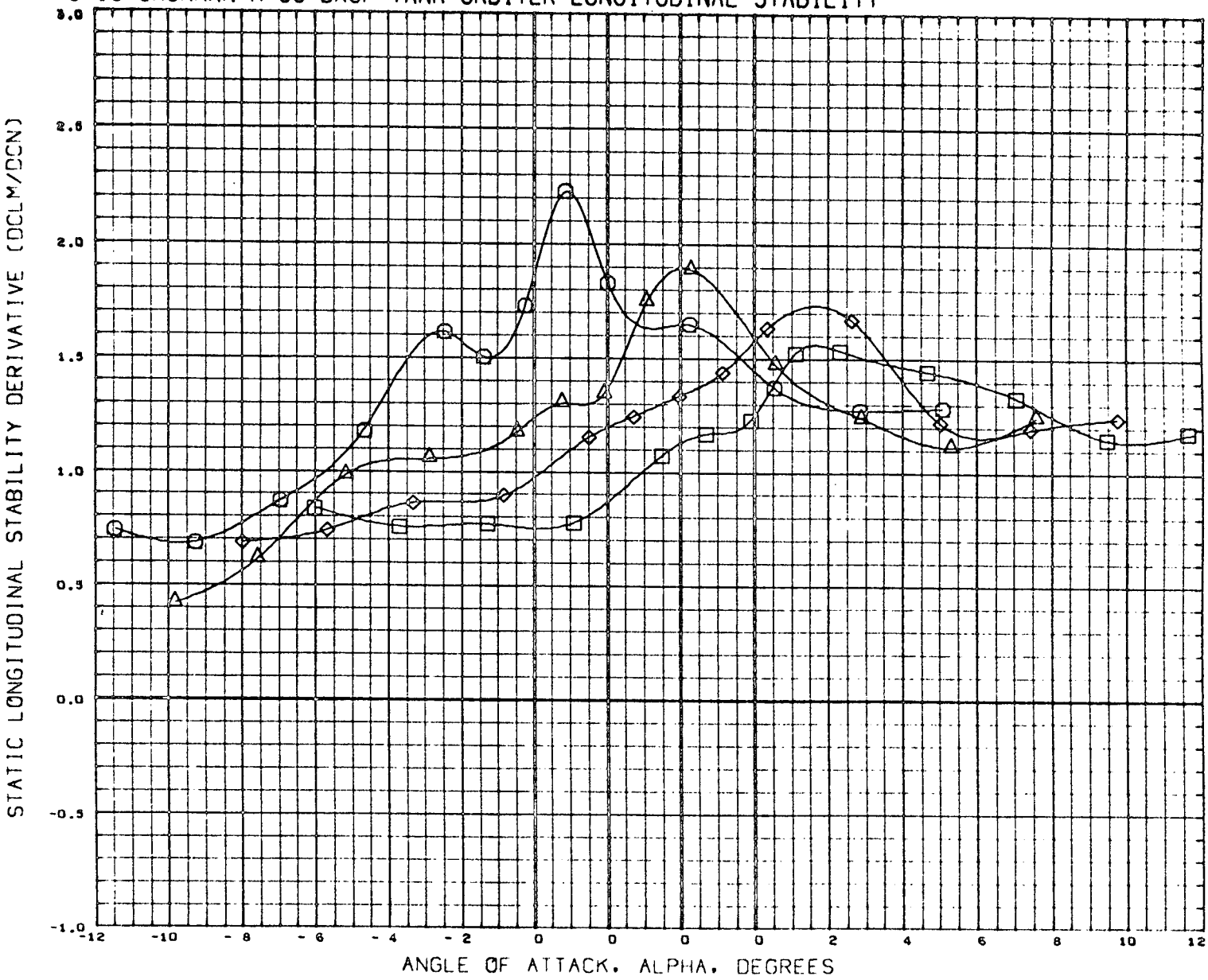
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

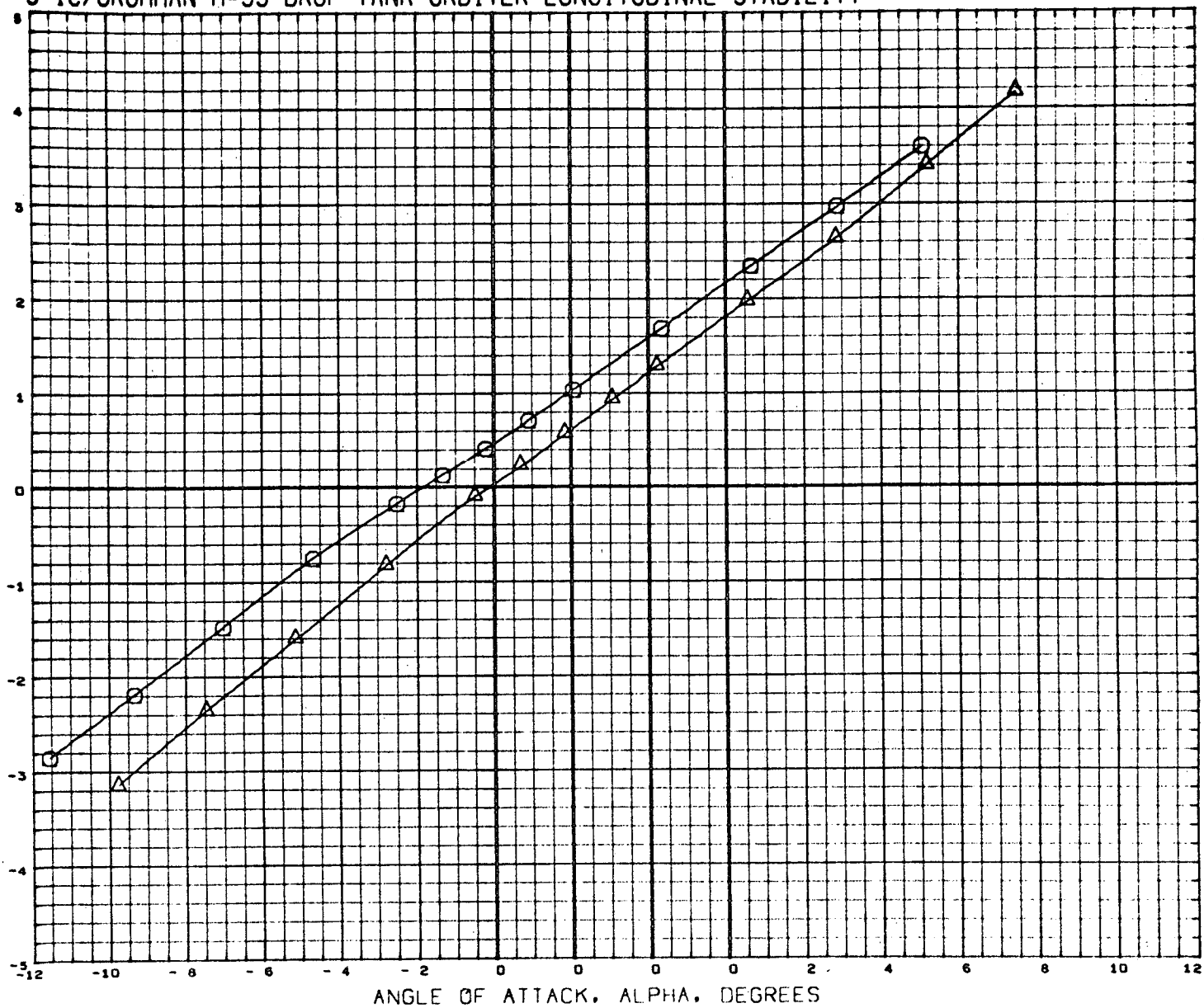


SYMBOL	MACH		PARAMETRIC VALUES		
○	0.899	BETA	0.000	PHI	0.000
△	0.999	WNGINC	1.240		
◇	1.097				
□	1.199				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES		
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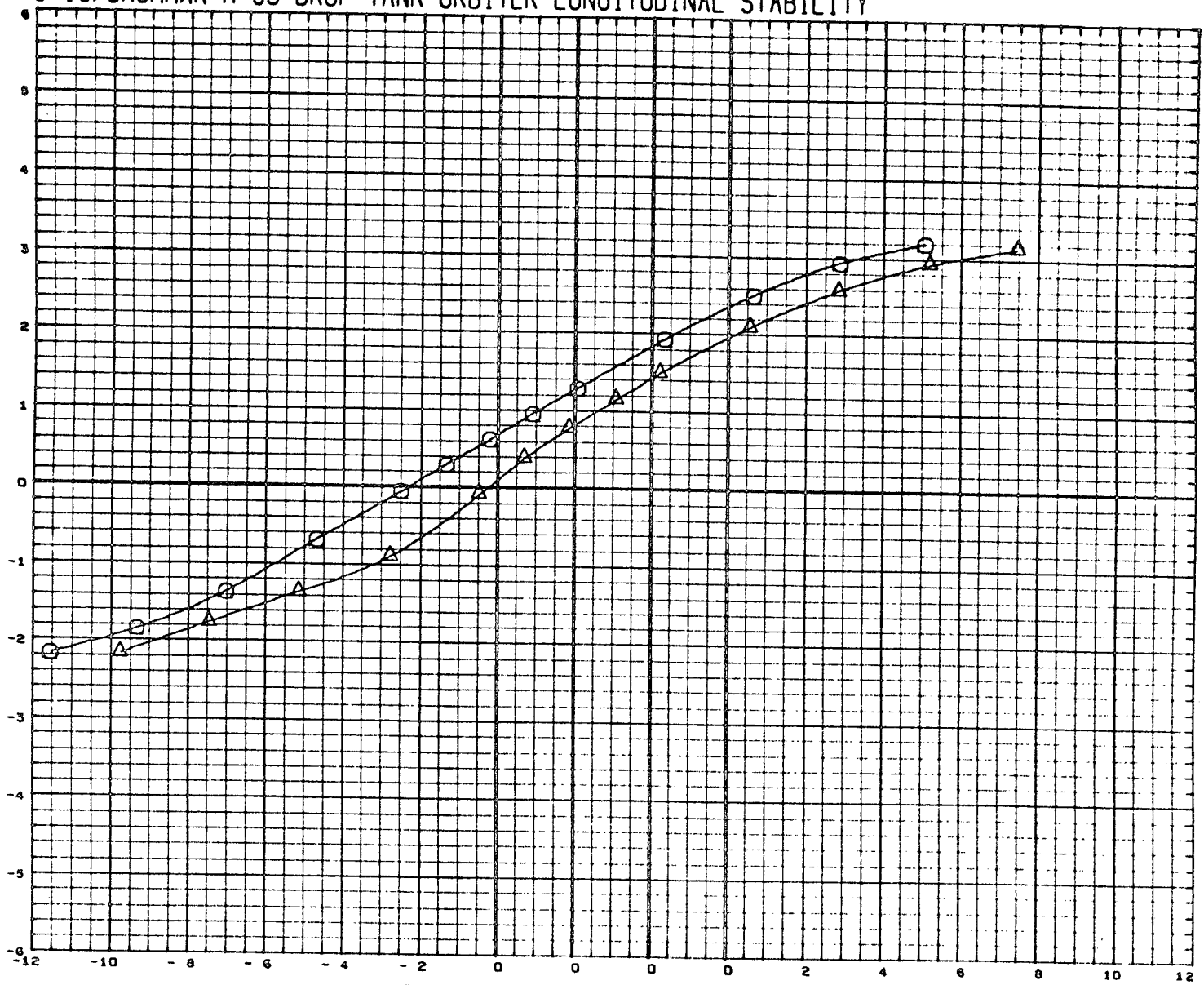
△	0.999	WNGINC	1.240		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES		
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△	0.999	WNGINC	1.240		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

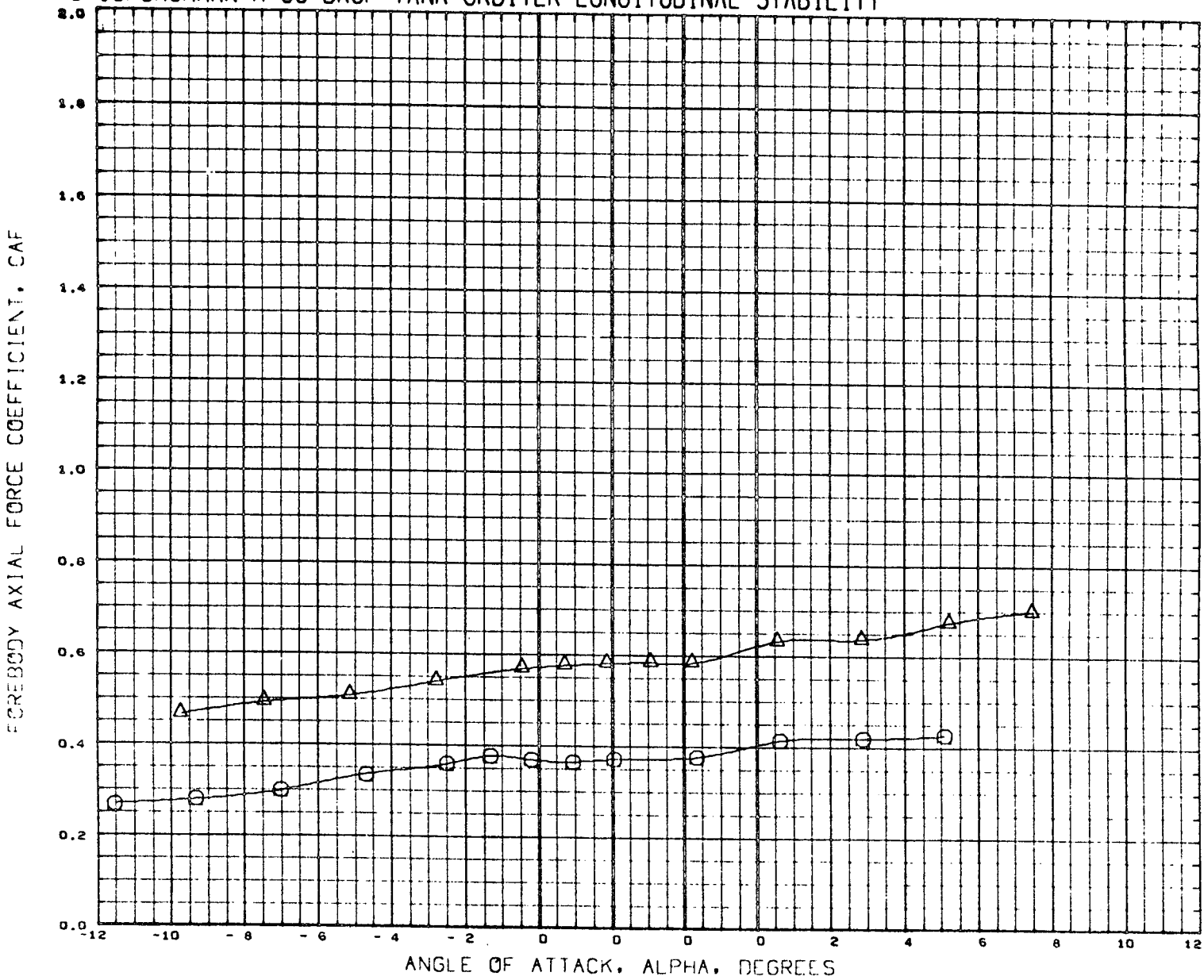
SYMBOL	MACH	PARAMETRIC VALUES			
△	0.900	BETA	0.000	PHI	0.000
○	0.999	WNGINC	1.240		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES		
△	0.900	BETA	0.000	PHI	0.000
○	0.999	WNGINC	1.240		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

MSC2 MSFC S1C H-33 ORBITER OWVCBF (C44021) 12 MAY 72 PAGE 16

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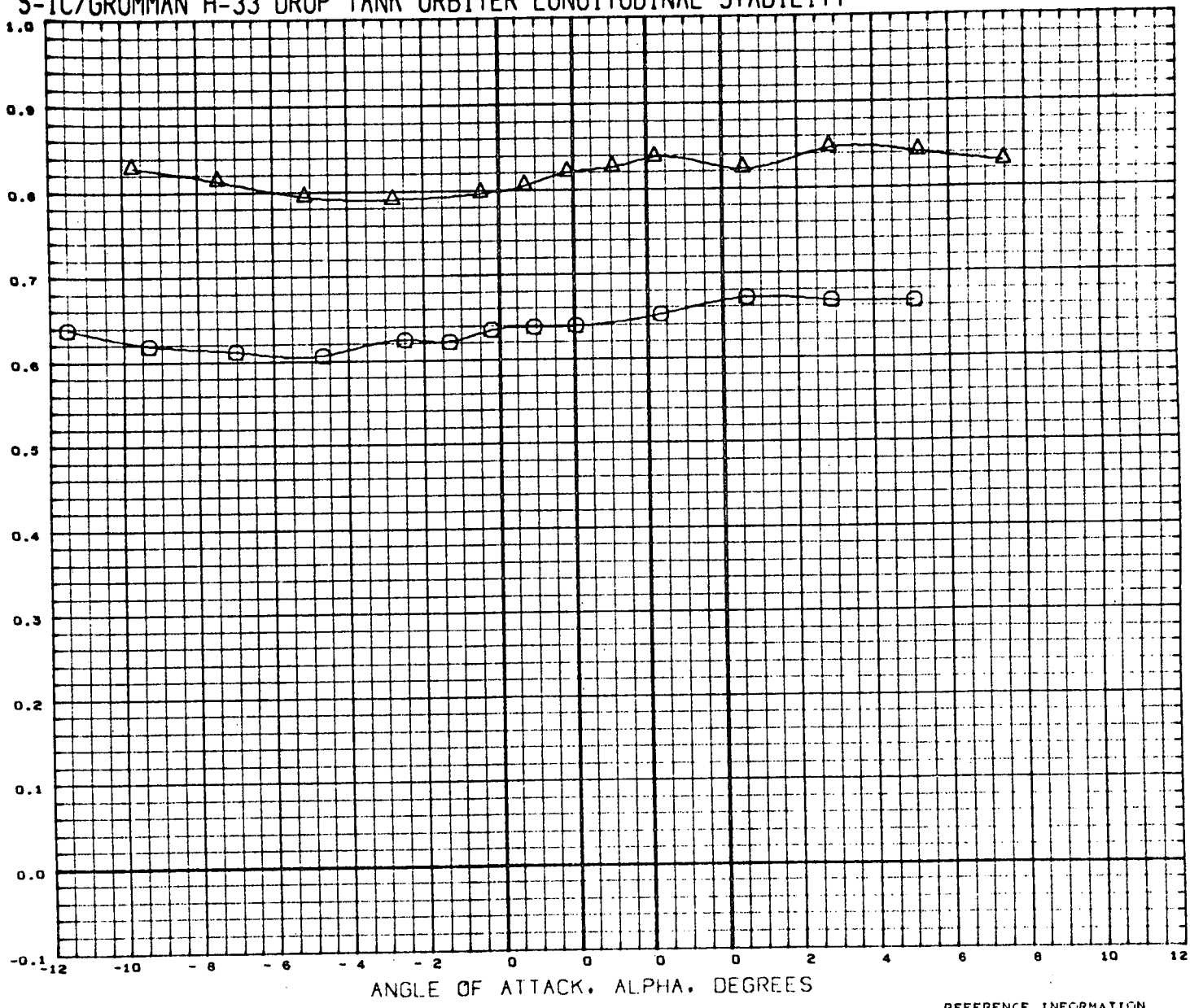
S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



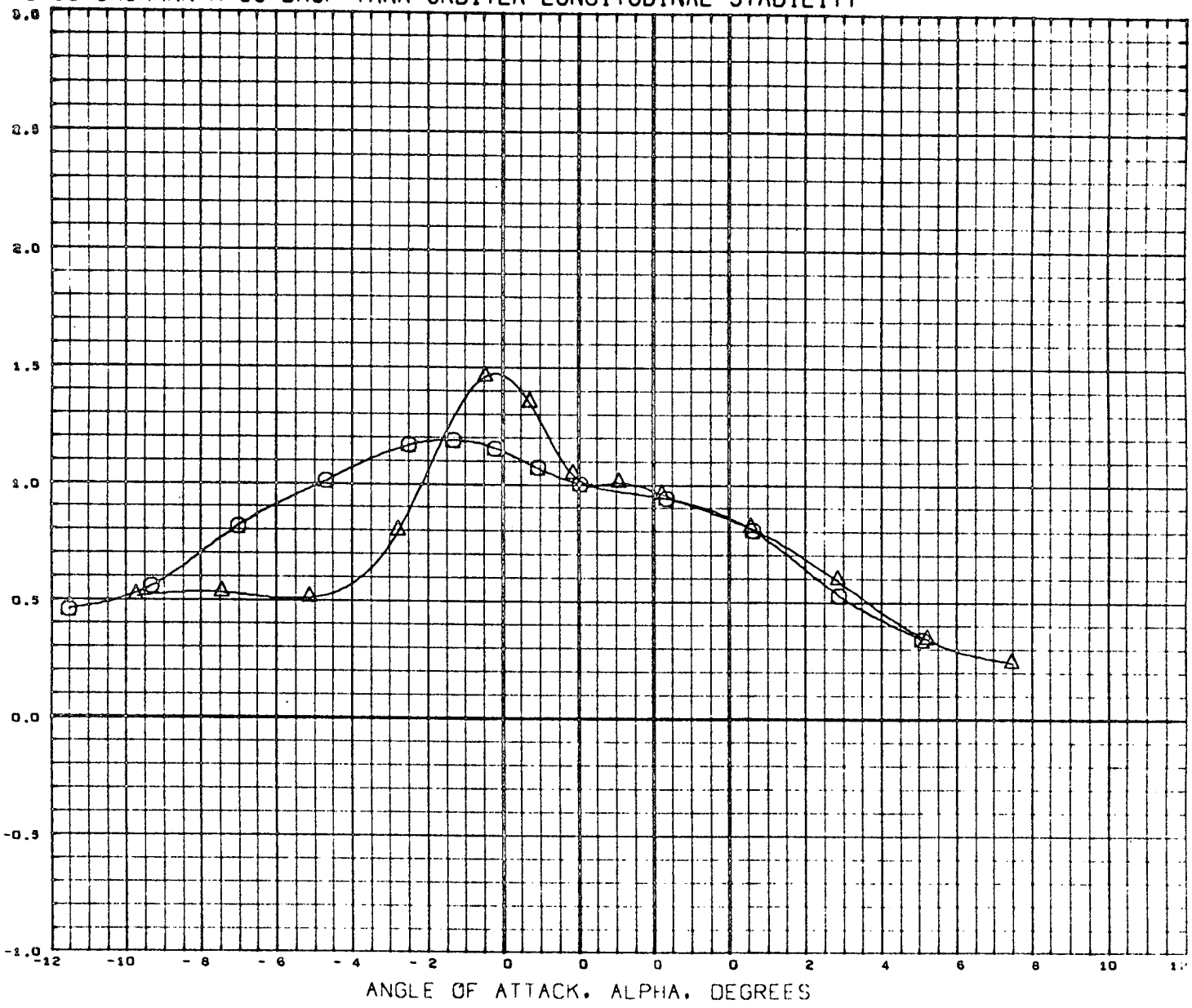
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.900	BETA	0.000	PHI	0.000
△	0.999	WNGINC	1.240		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



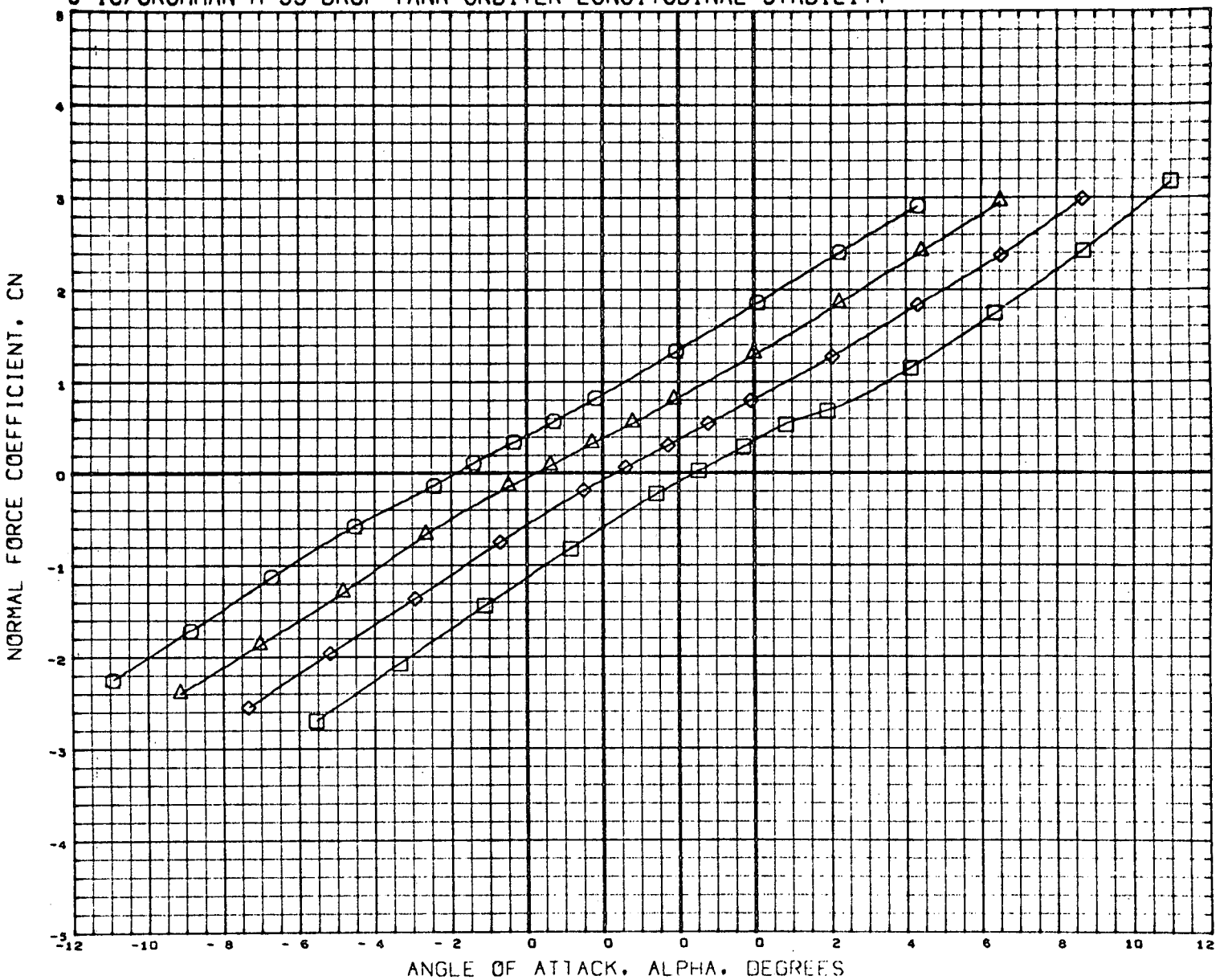
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.900	BETA	0.000	PHI	0.000
△	0.999	WNGINC	1.240		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH
○	0.599
△	0.703
◇	0.801
□	0.904

PARAMETRIC VALUES

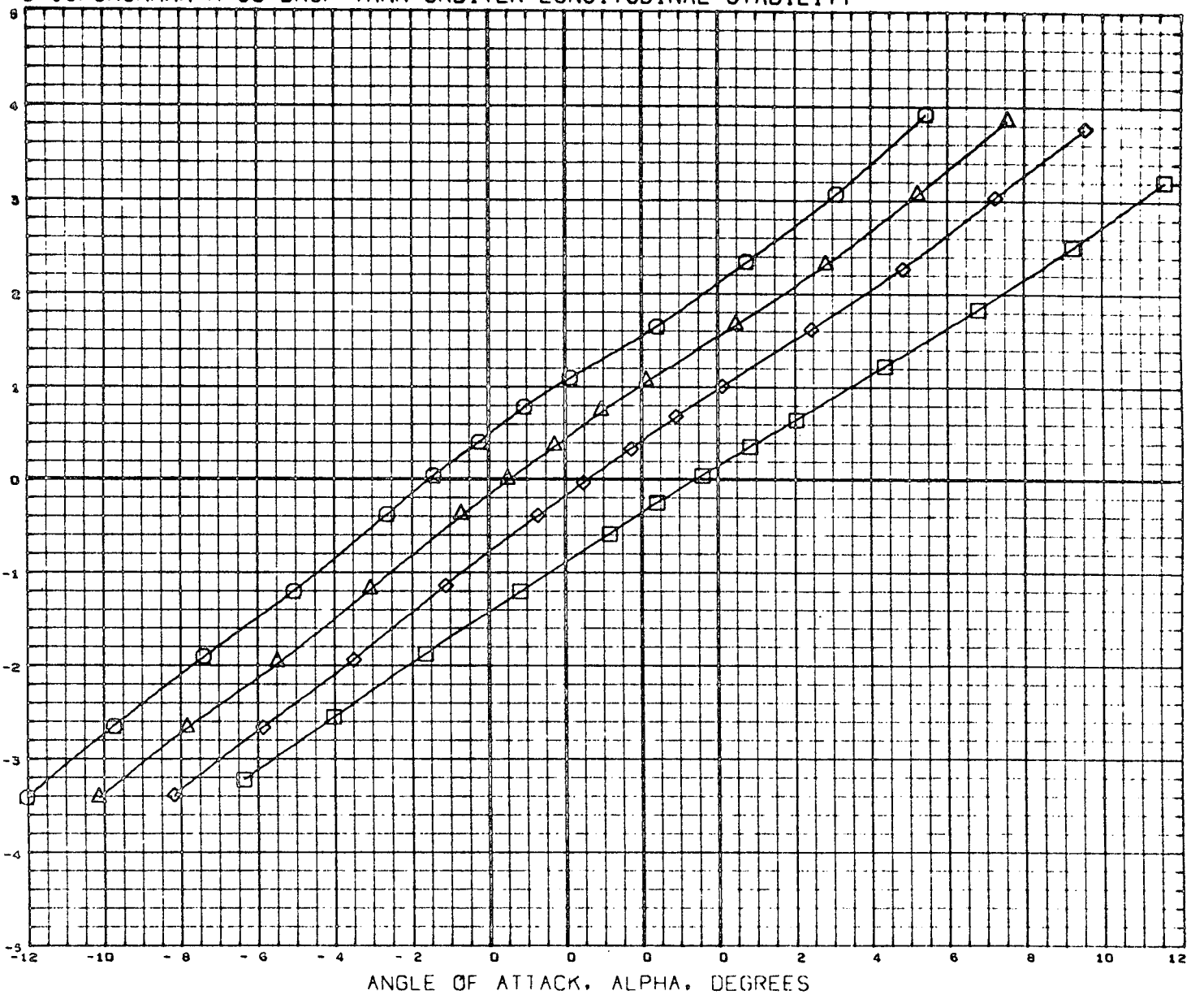
BETA	0.000	PHI	0.000	
WNGINC	0.000			

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

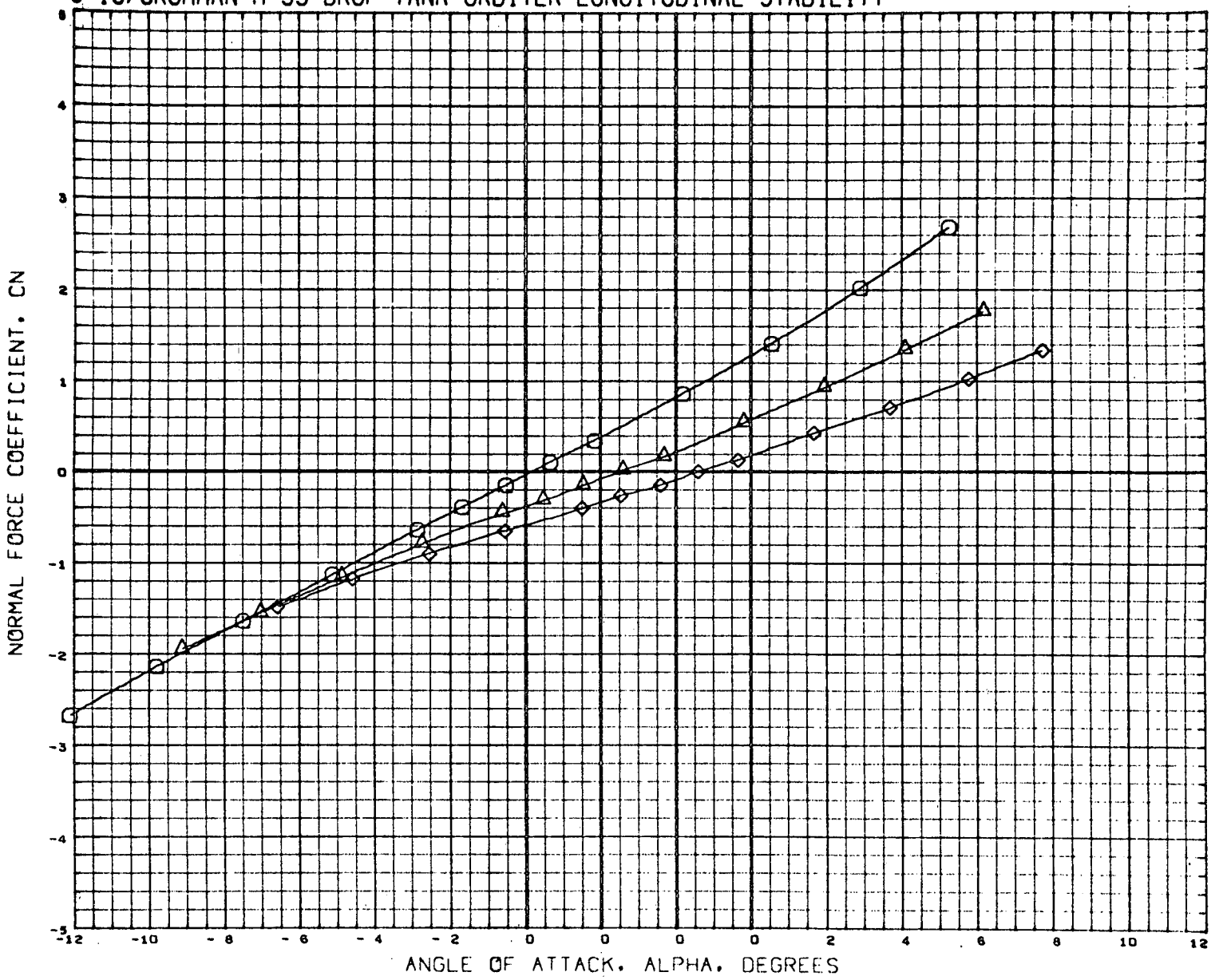


SYMBOL	MACH	PARAMETRIC VALUES			
	0.999	BETA	0.000	PHI	0.000
△	1.103	WNGINC	0.000		
◇	1.202				
□	1.465				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



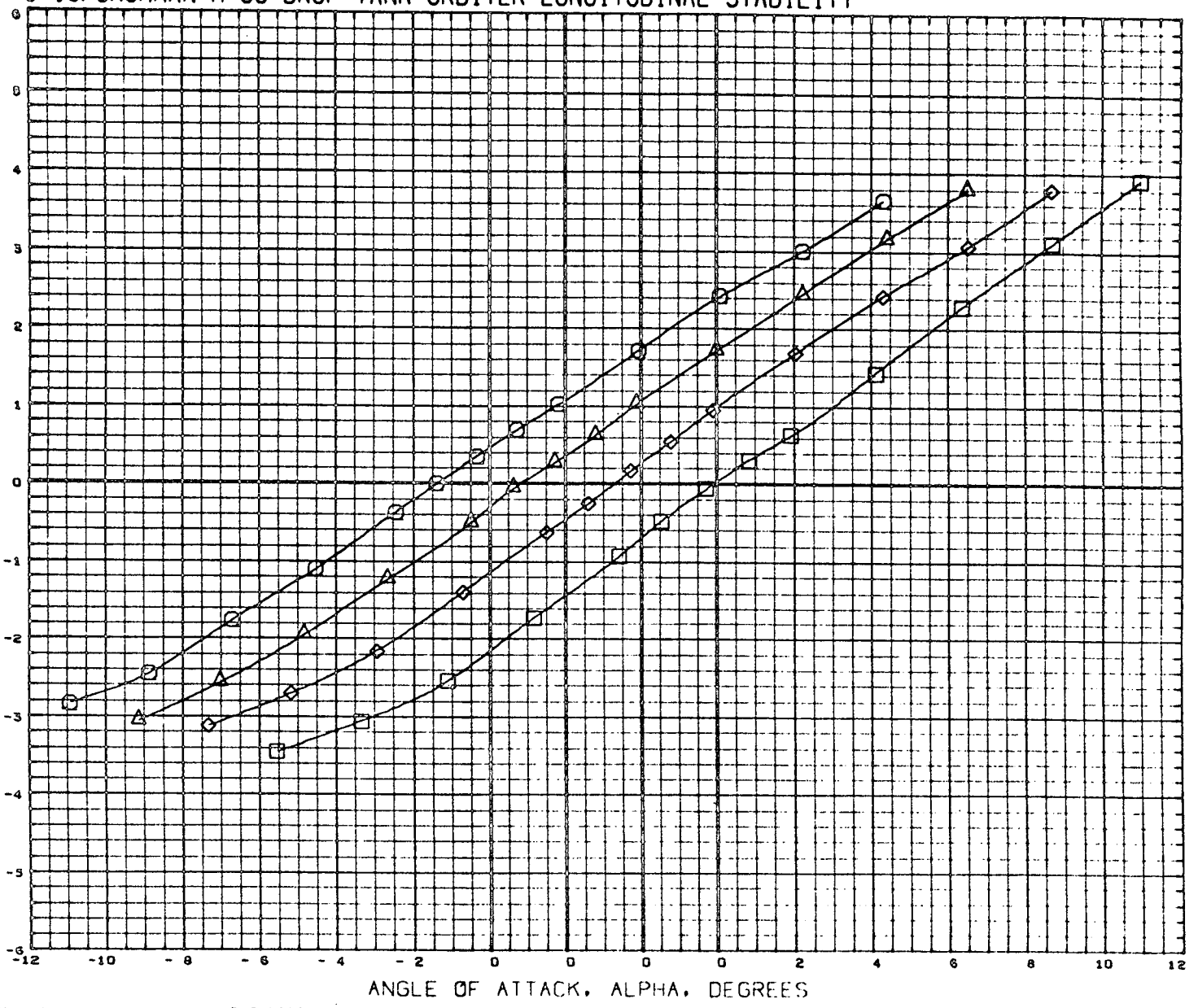
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.965	BETA	0.000	PHI	0.000
△	3.480	WNGINC	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



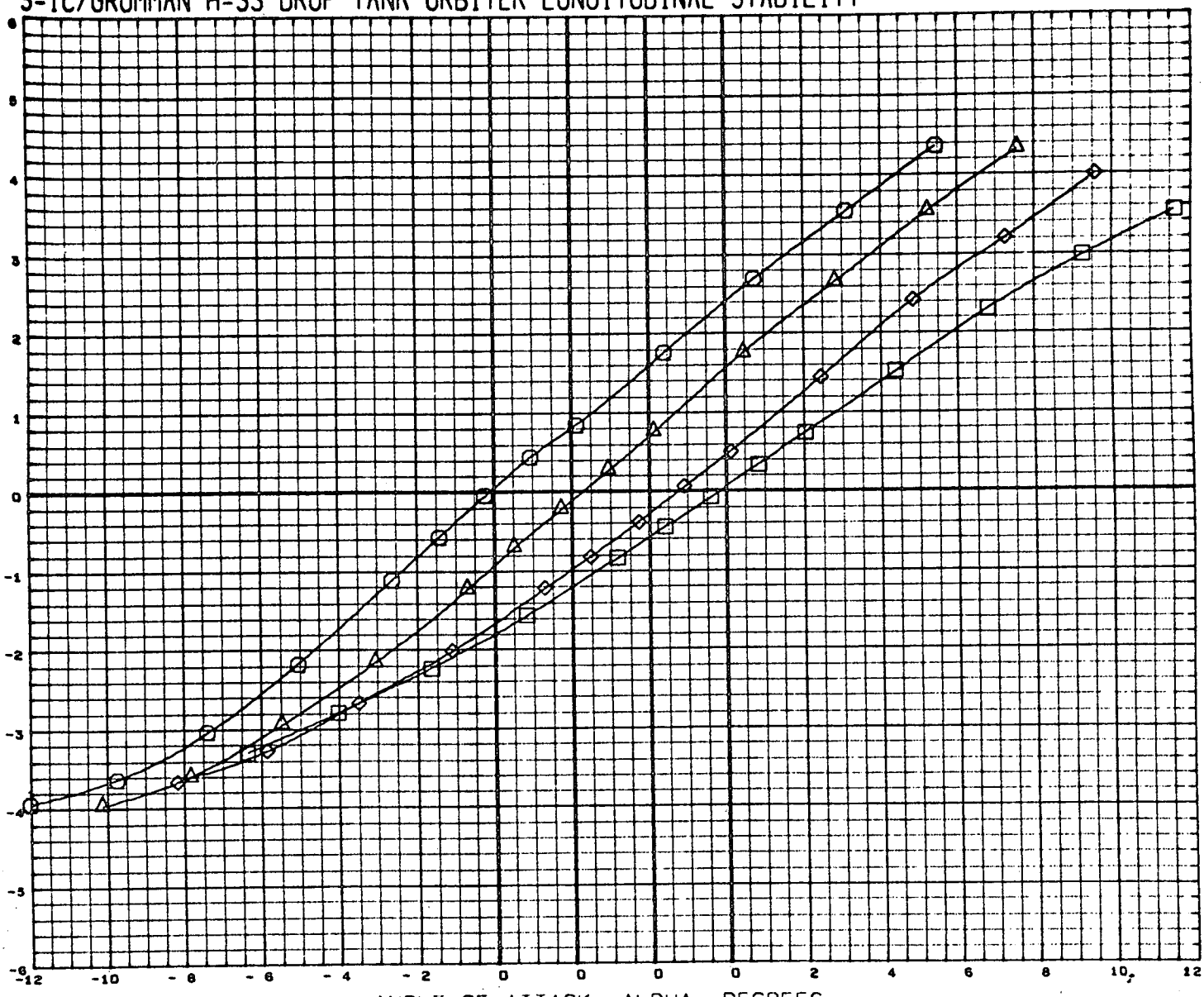
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.599	BETA	0.000	PHI	0.000
△	0.703	WNGINC	0.000		
◇	0.801				
□	0.904				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



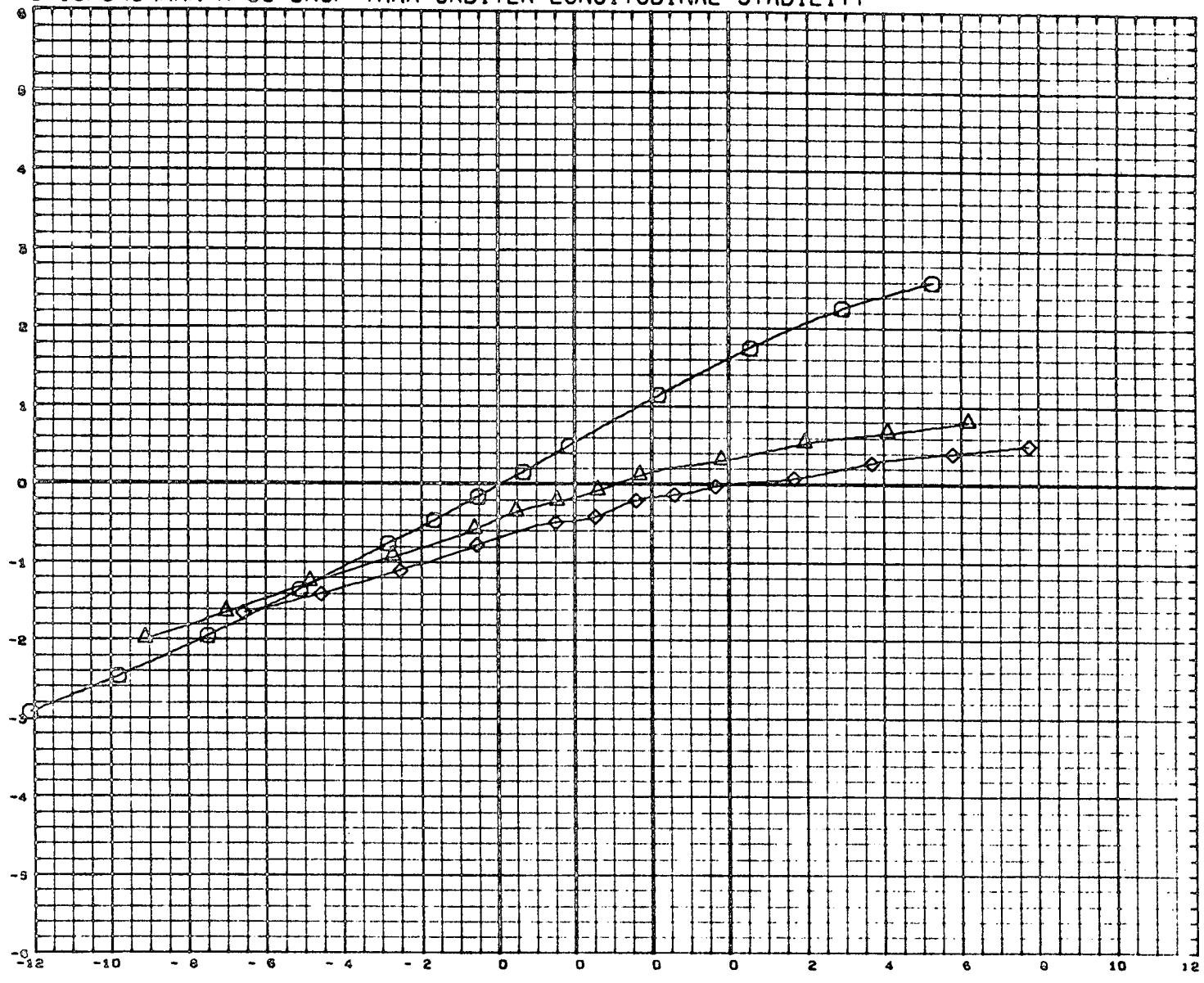
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.999	BETA	0.000	PHI	0.000
△	1.103	WNGINC	0.000		
◇	1.202				
□	1.465				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES		
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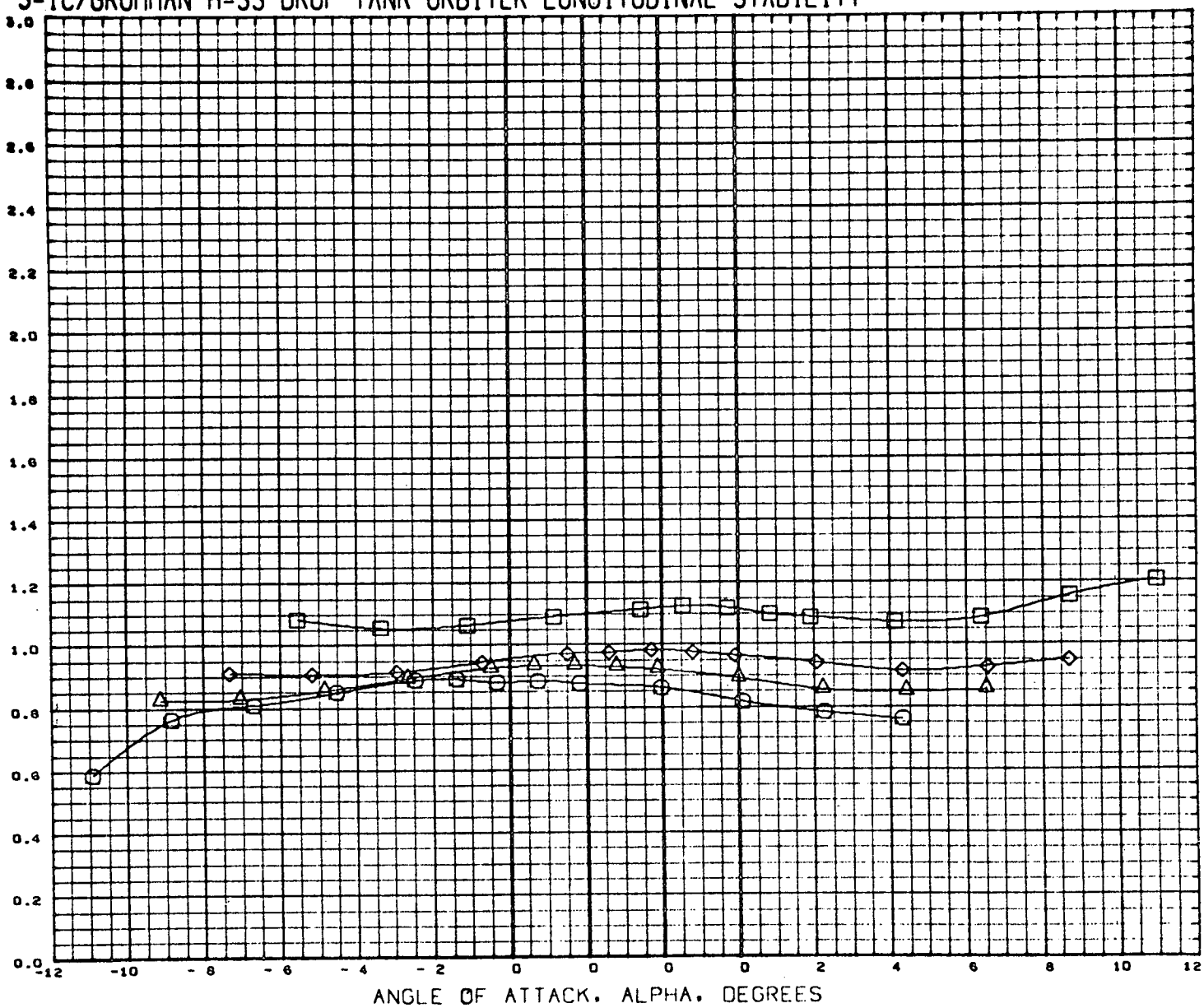
△	3.480	WBGINC	0.000		
◇	4.950				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH
○	0.599
△	0.703
◇	0.801
□	0.904

PARAMETRIC VALUES

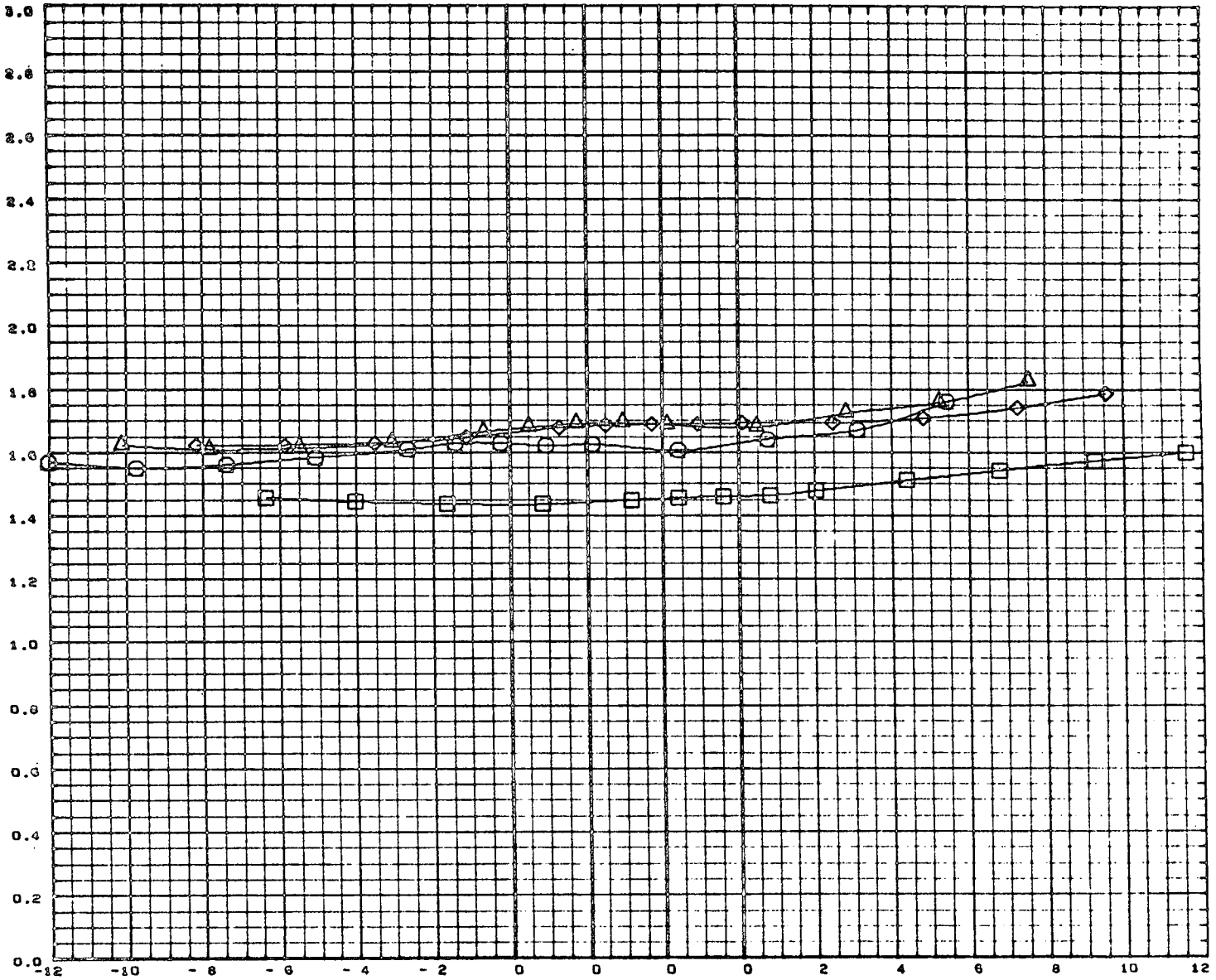
BETA	0.000	PHI	0.000	
WNGINC	0.000			

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



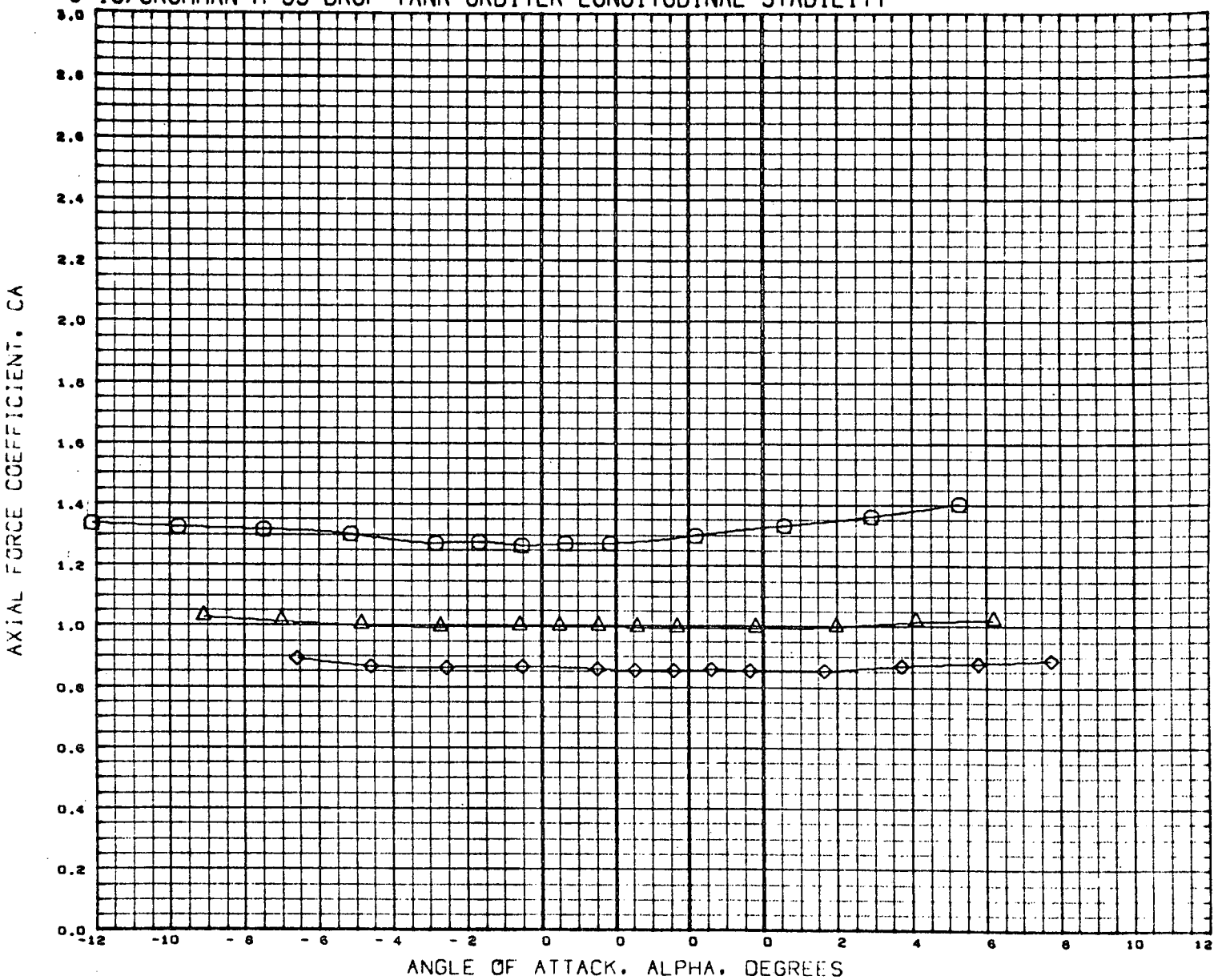
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.999	BETA	0.000	PHI	0.000
△	1.103	WNGINC	0.000		
◇	1.202				
□	1.465				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



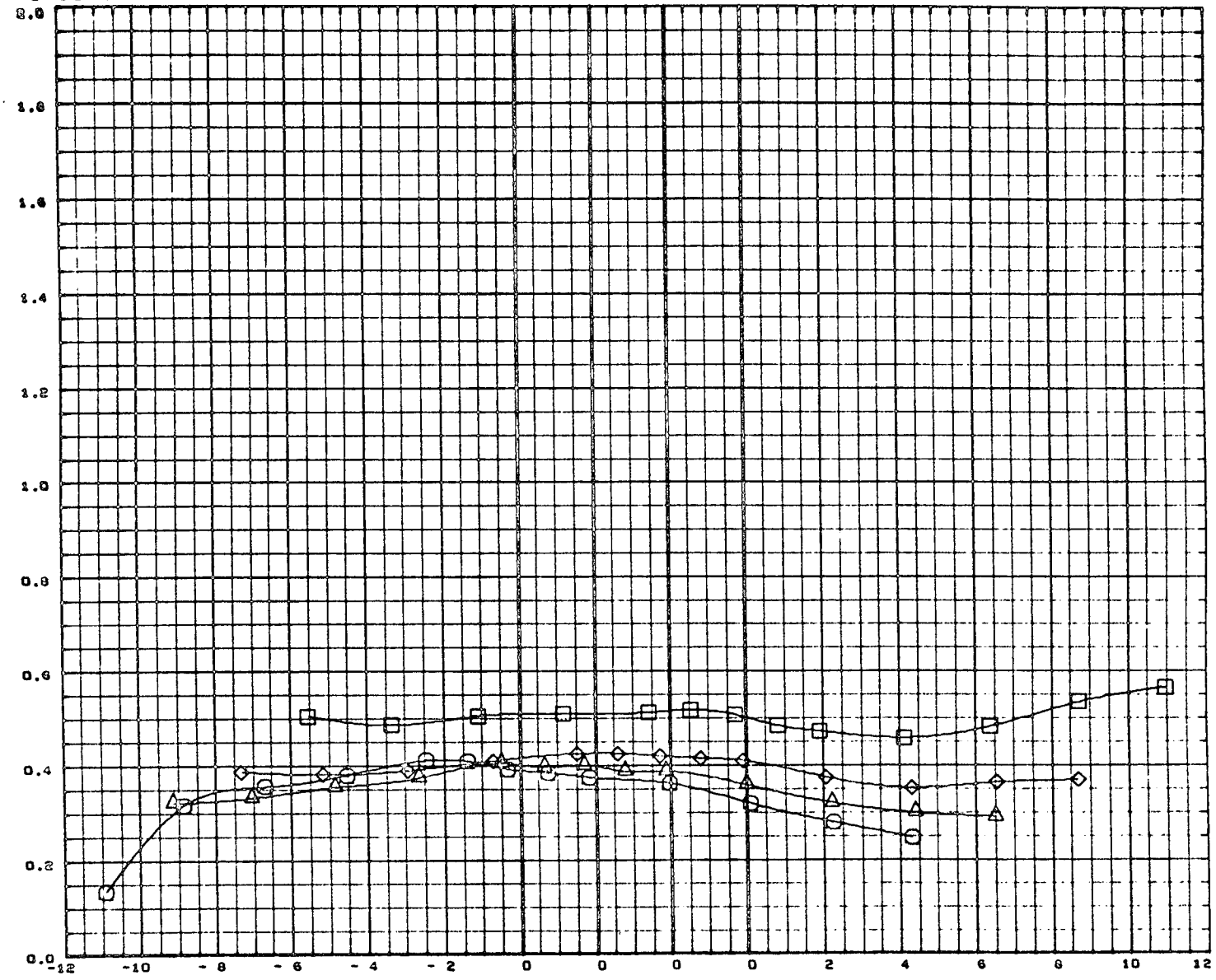
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.965	BETA	0.000	PHI	0.000
△	3.480	WNGINC	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



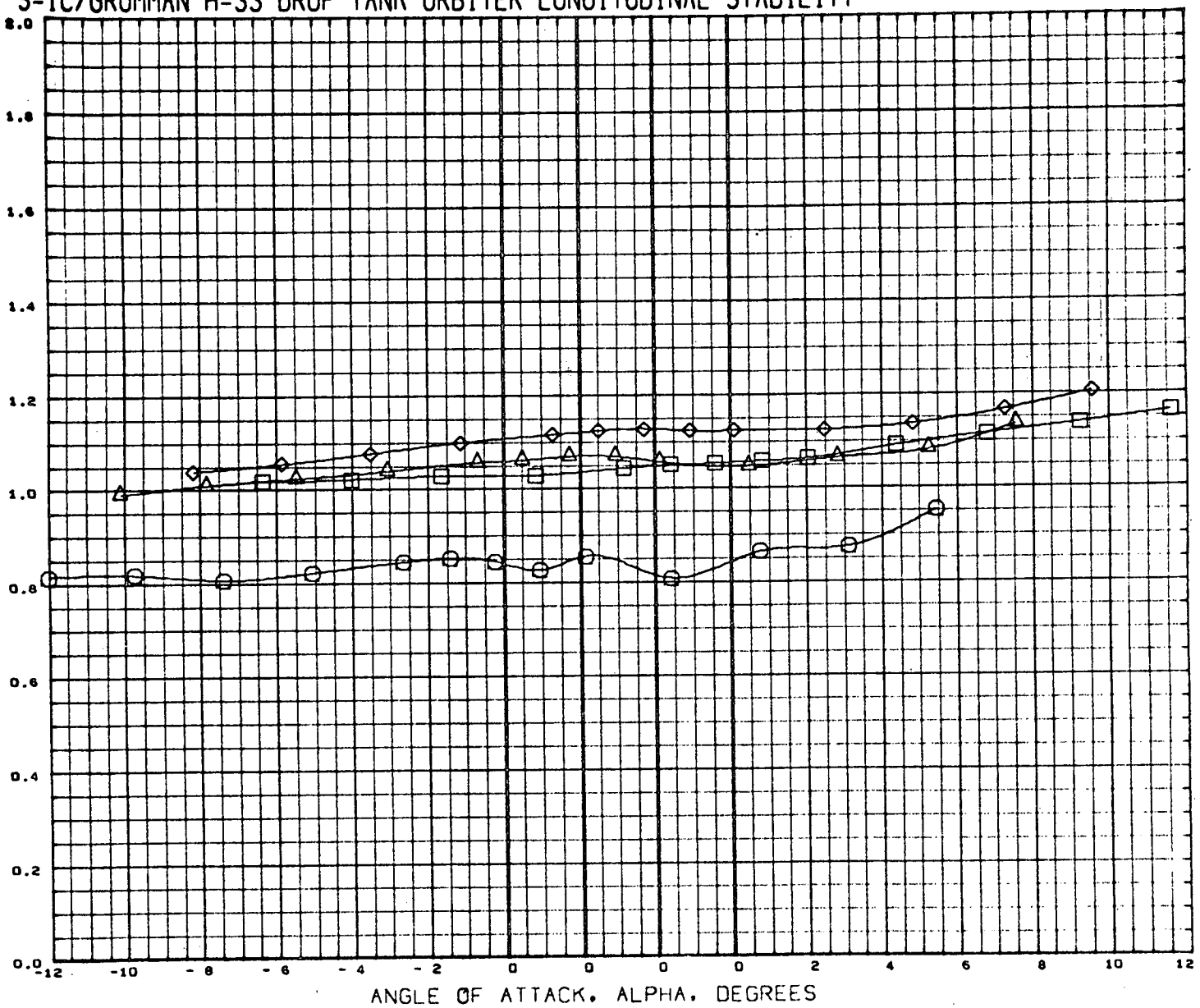
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.599	BETA	0.000	PHI	0.000
△	0.703	WNGINC	0.000		
◇	0.801				
□	0.904				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



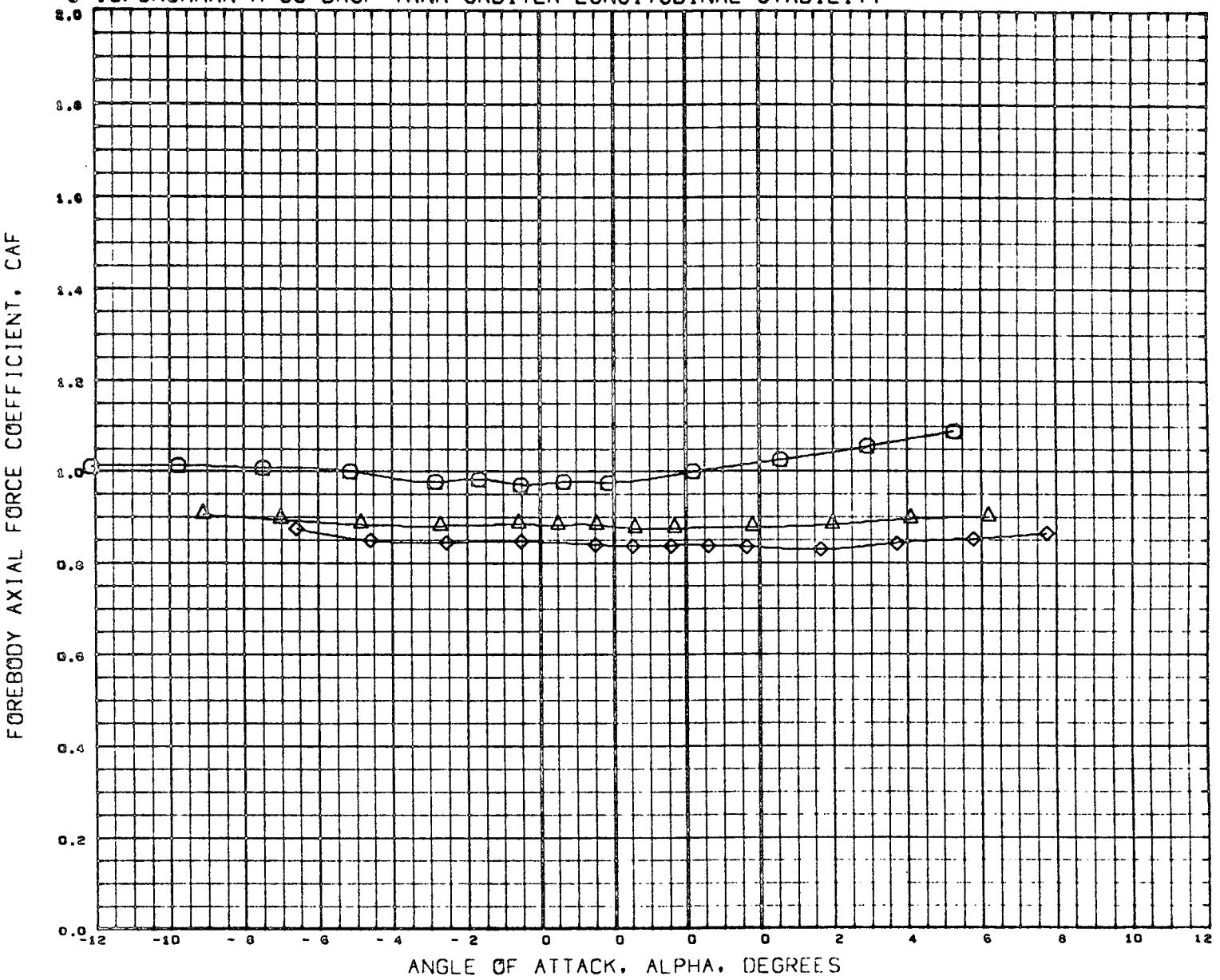
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.999	BETA	0.000	PHI	0.000
△	1.103	WNGINC	0.000		
◇	1.202				
□	1.465				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



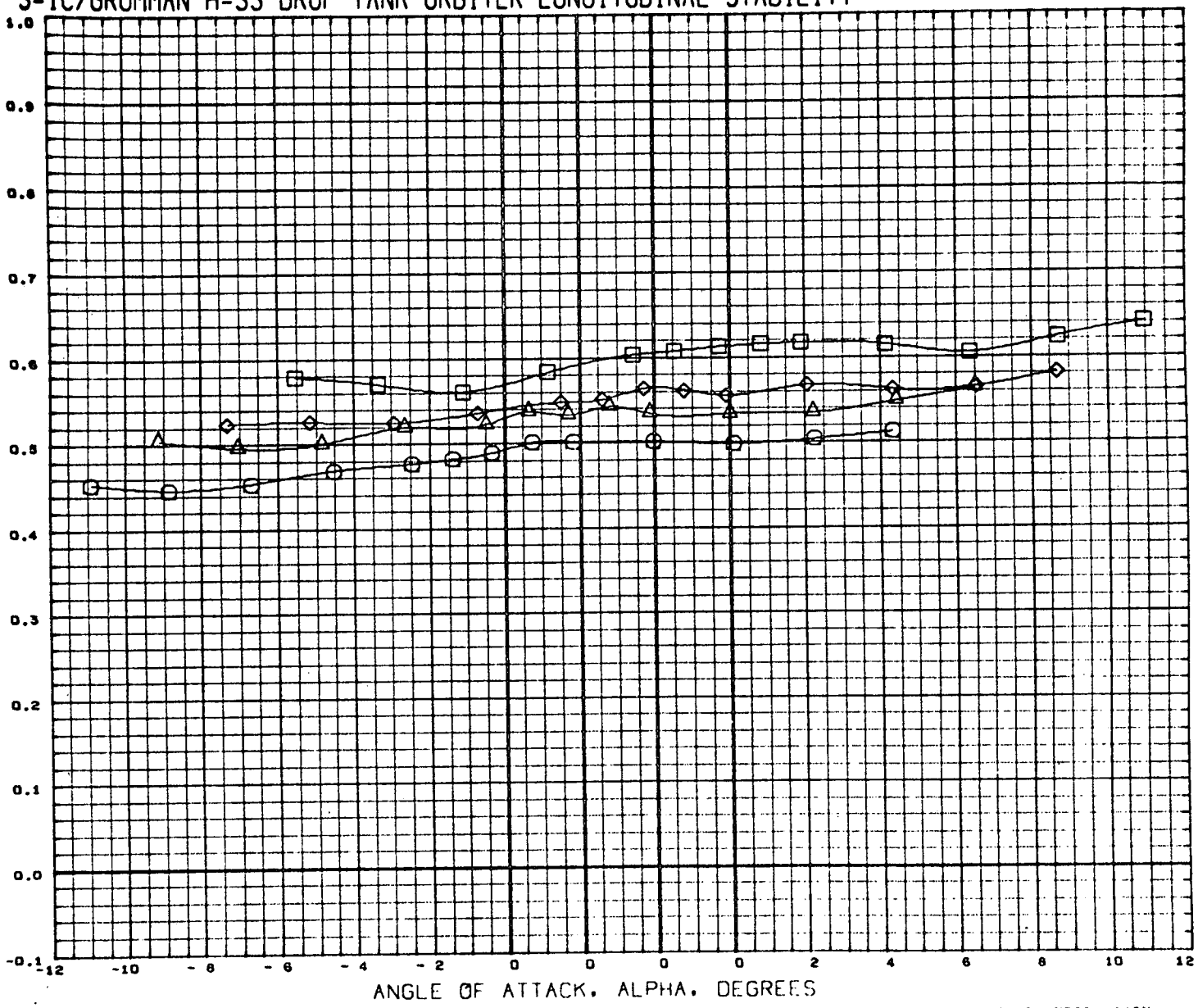
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.969	BETA	0.000	PHI	0.000
△	3.480	WNGINC	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3900	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



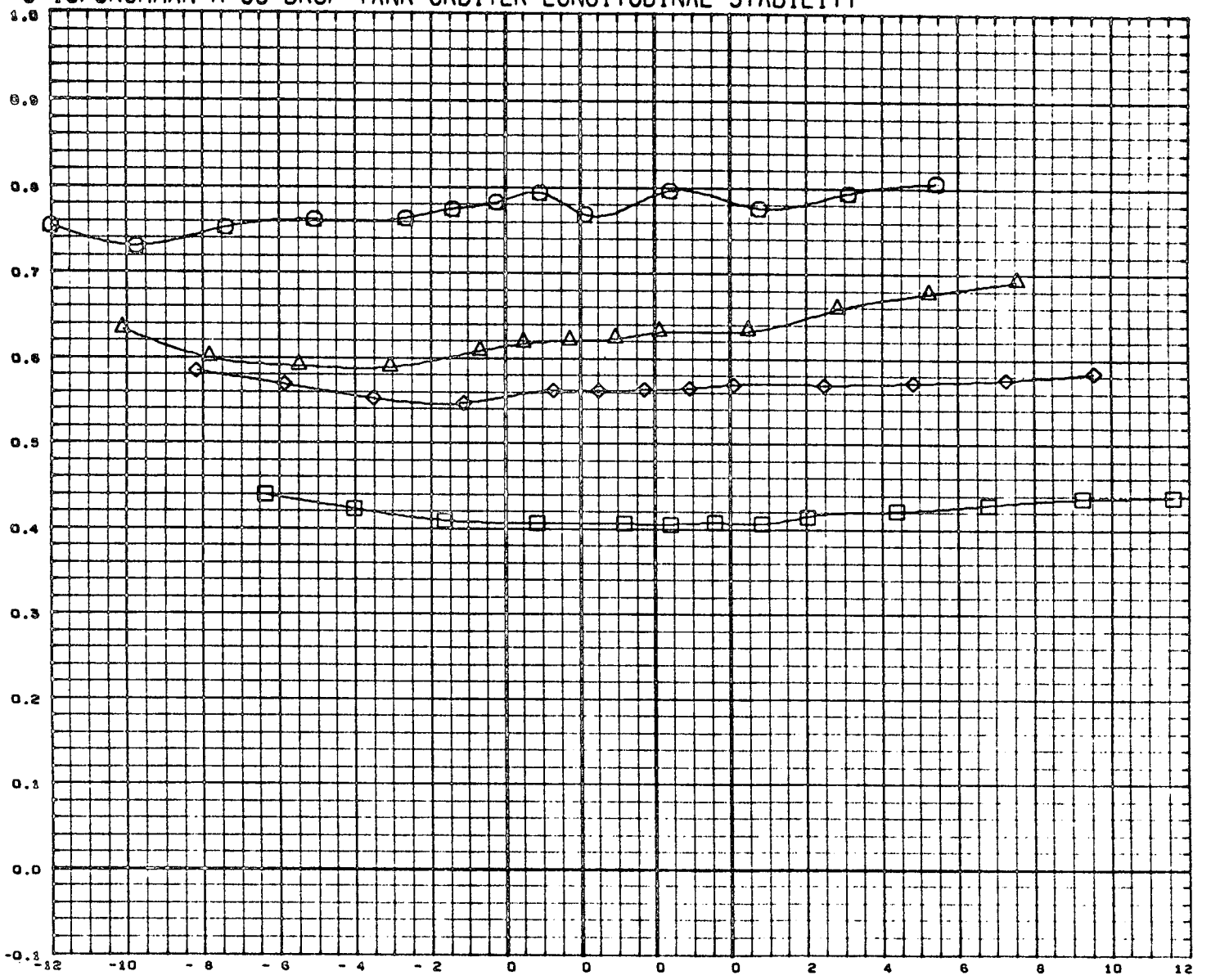
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.599	BETA	0.000	PHI	0.000
△	0.703	WBGINC	0.000		
◇	0.801				
□	0.904				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

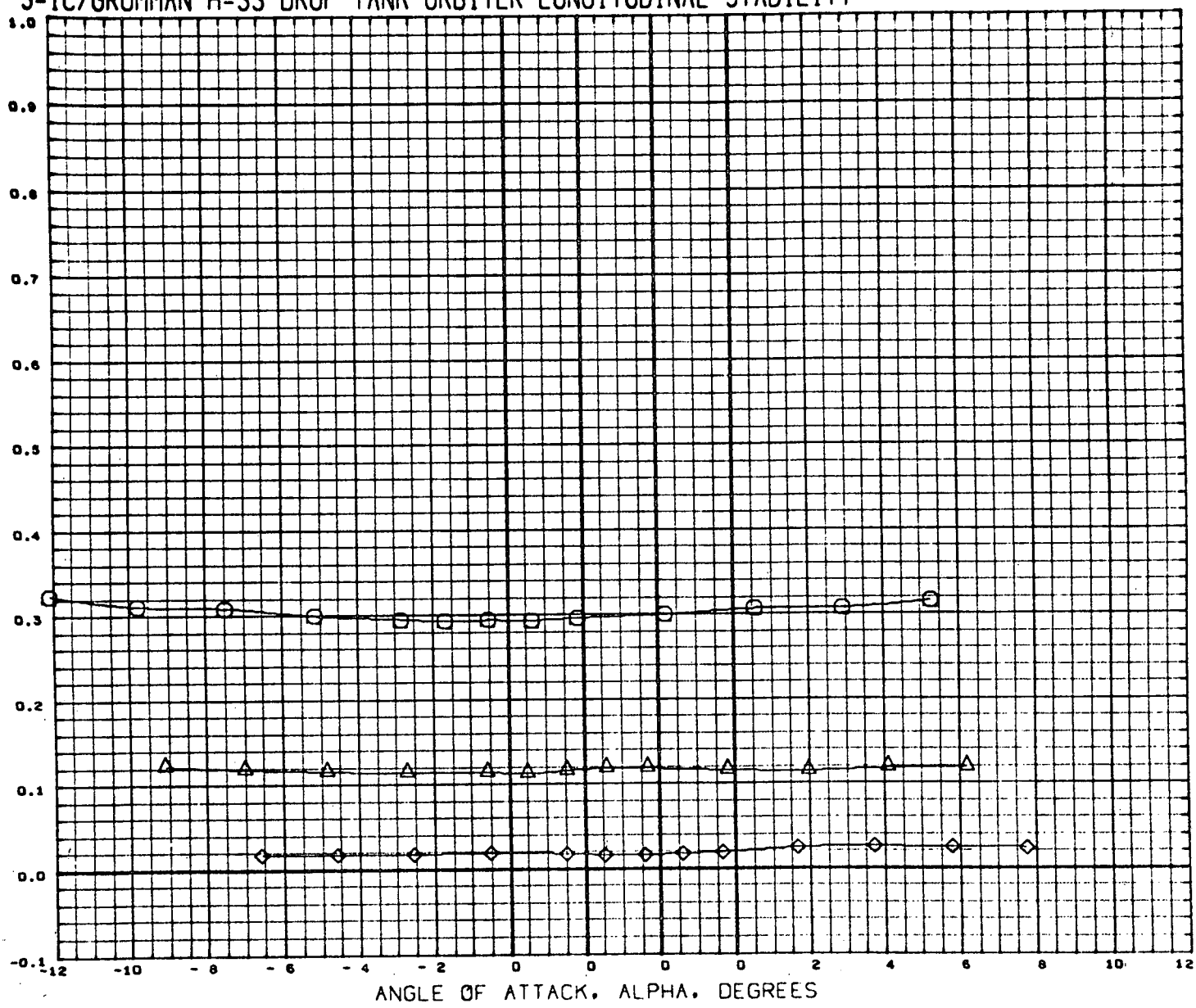


SYMBOL	MACH	PARAMETRIC VALUES			
○	0.939	BETA	0.000	PHI	0.000
△	1.103	WNGINC	0.000		
◇	1.202				
□	1.465				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



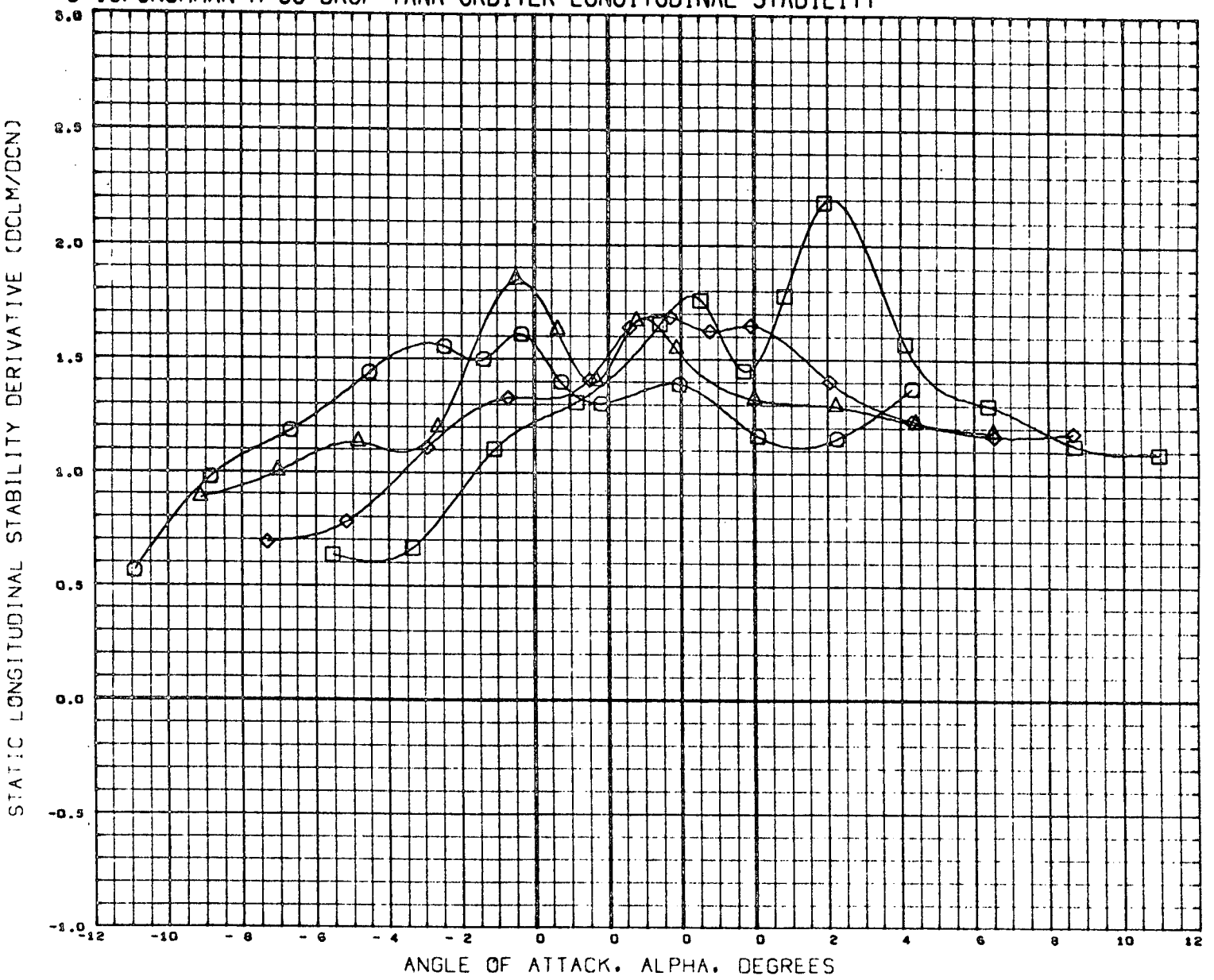
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.965	BETA	0.000	PHI	0.000
△	3.480	WNGINC	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



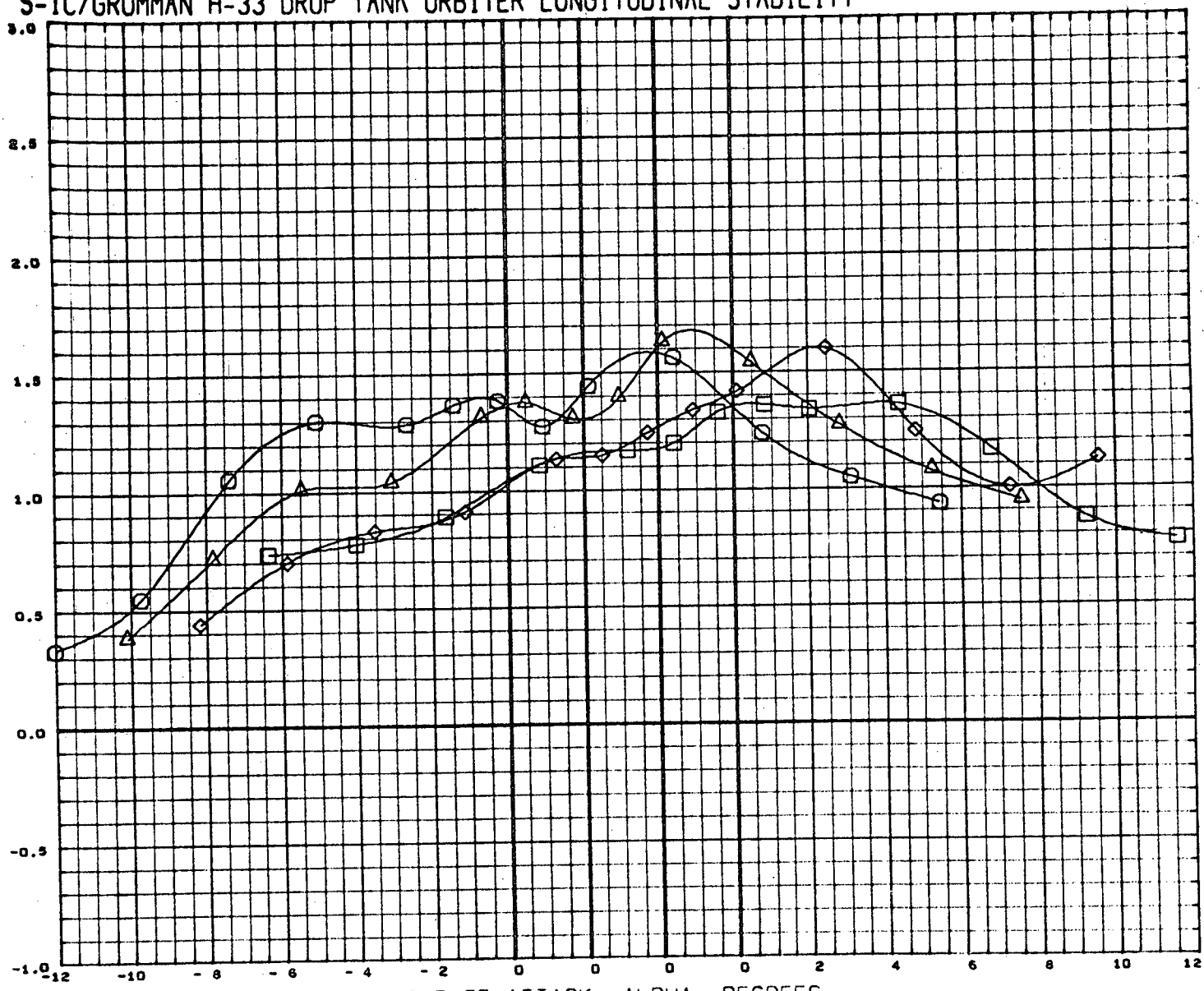
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.599	BETA	0.000	PHI	0.000
△	0.703	WNGINC	0.000		
◇	0.801				
□	0.904				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



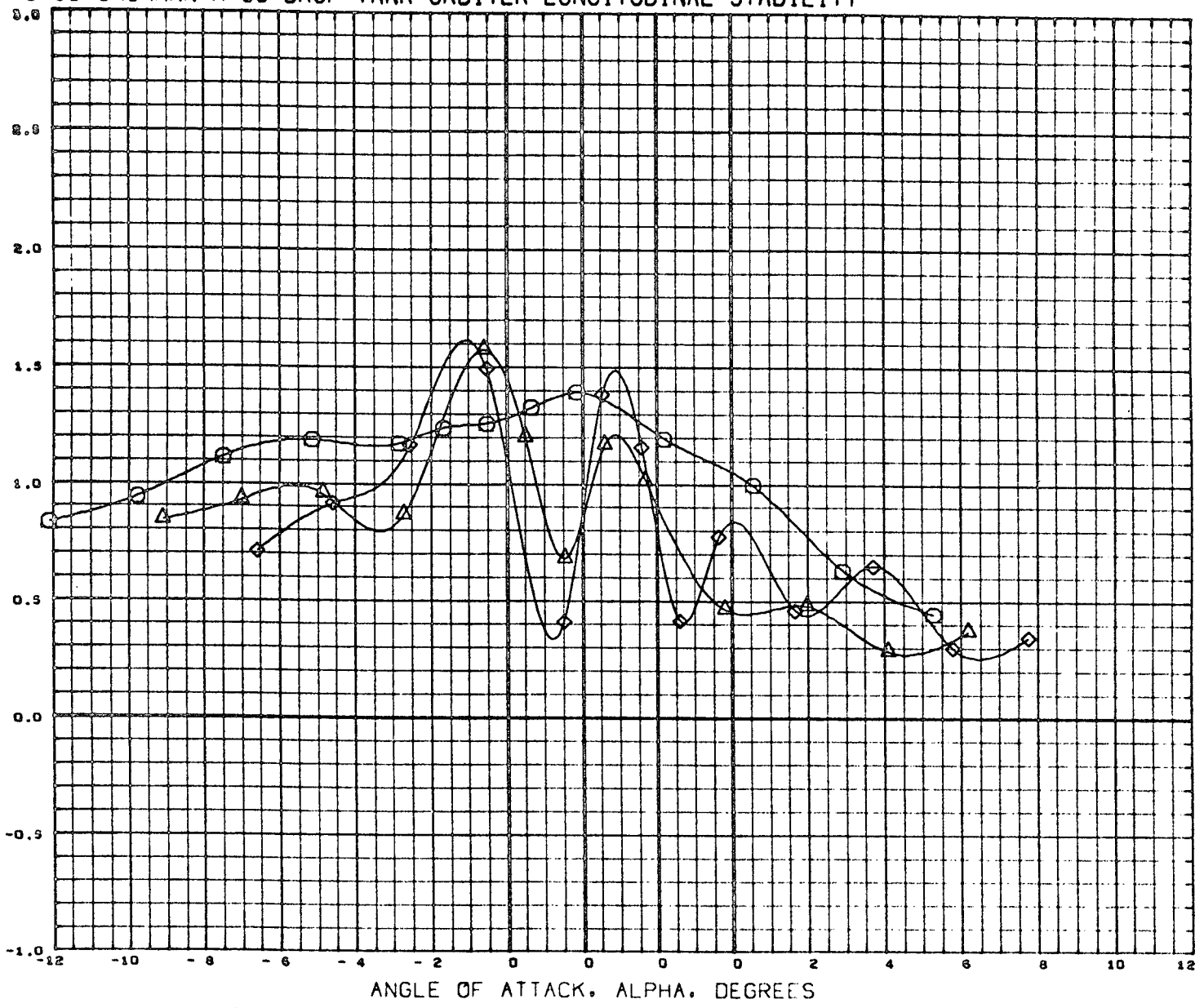
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.999	BETA	0.000	PHI	0.000
△	1.103	WNGINC	0.000		
◇	1.202				
□	1.465				

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



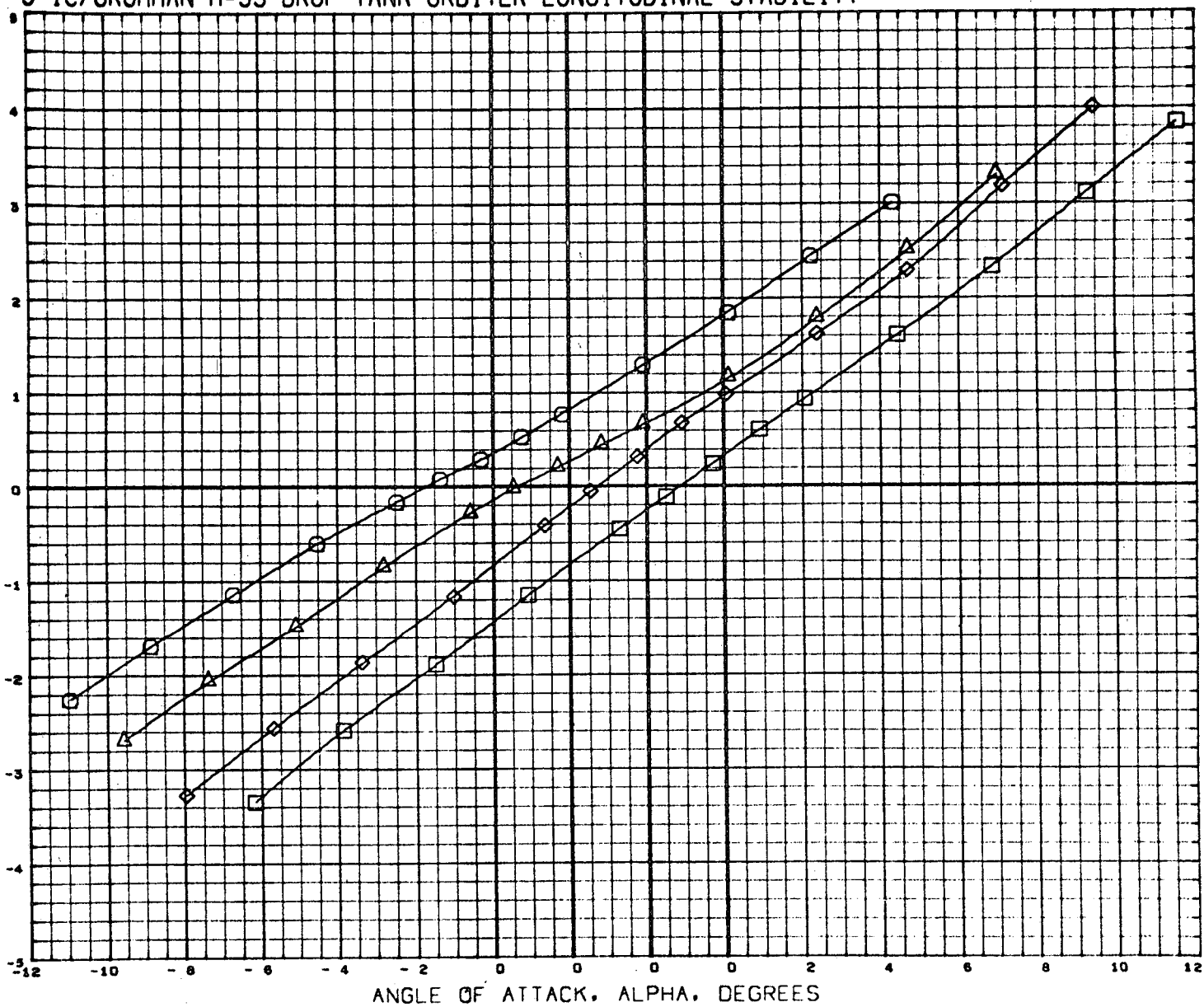
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.965	BETA	0.000	PHI	0.000
△	3.480	WNGINC	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



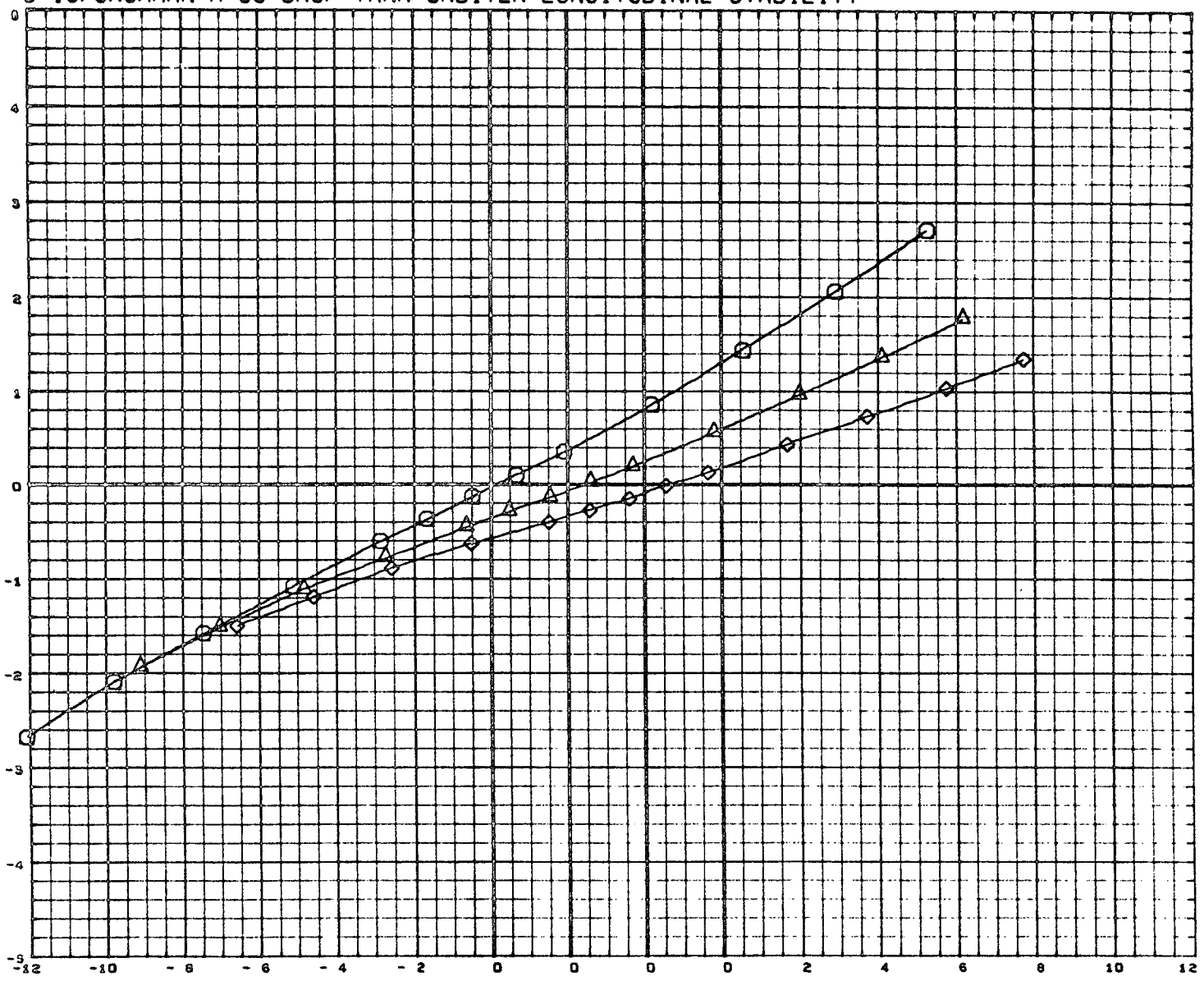
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.599	BETA	0.000	PHI	0.000
△	0.901	WNGIN	0.000		
◇	0.998				
□	1.203				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



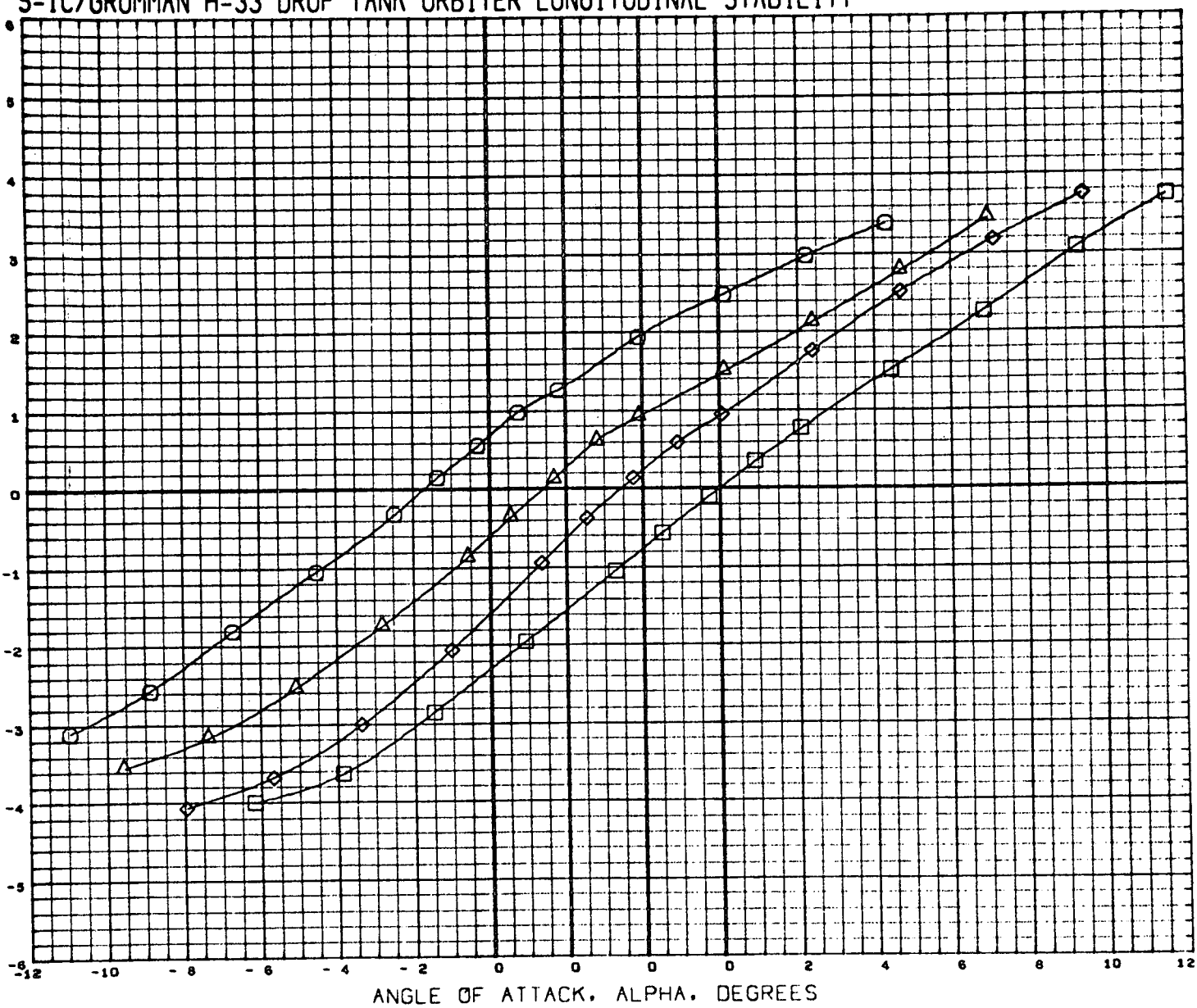
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.966	BETA	0.000	PHI	0.000
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



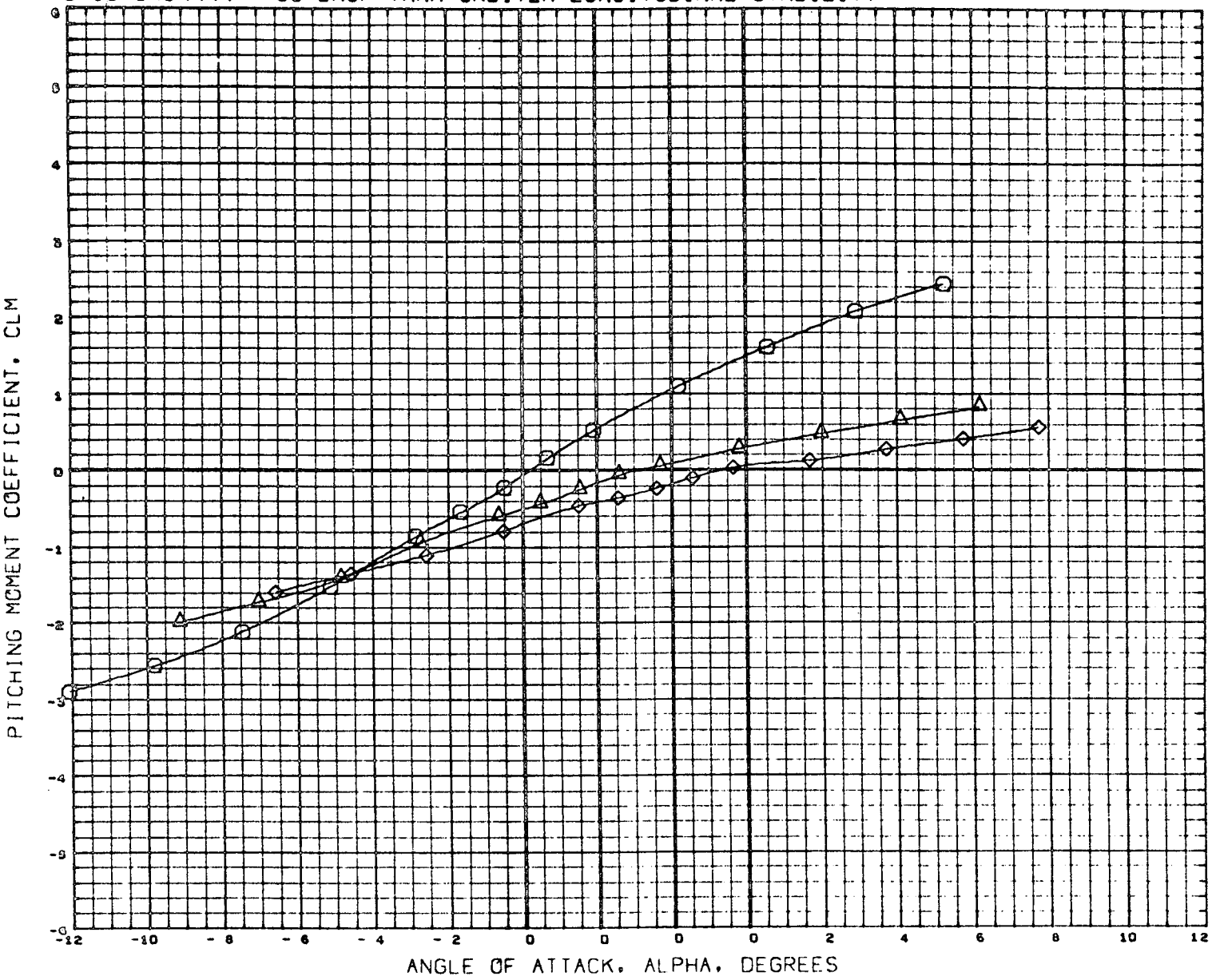
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.599	BETA	0.000	PHI	0.000
△	0.901	WAGIN	0.000		
◇	0.998				
□	1.203				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES		
○	1.966	BETA	0.000	PHI	0.000
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

SYMBOL	MACH
○	0.599
△	0.901
◇	0.998
□	1.203

PARAMETRIC VALUES

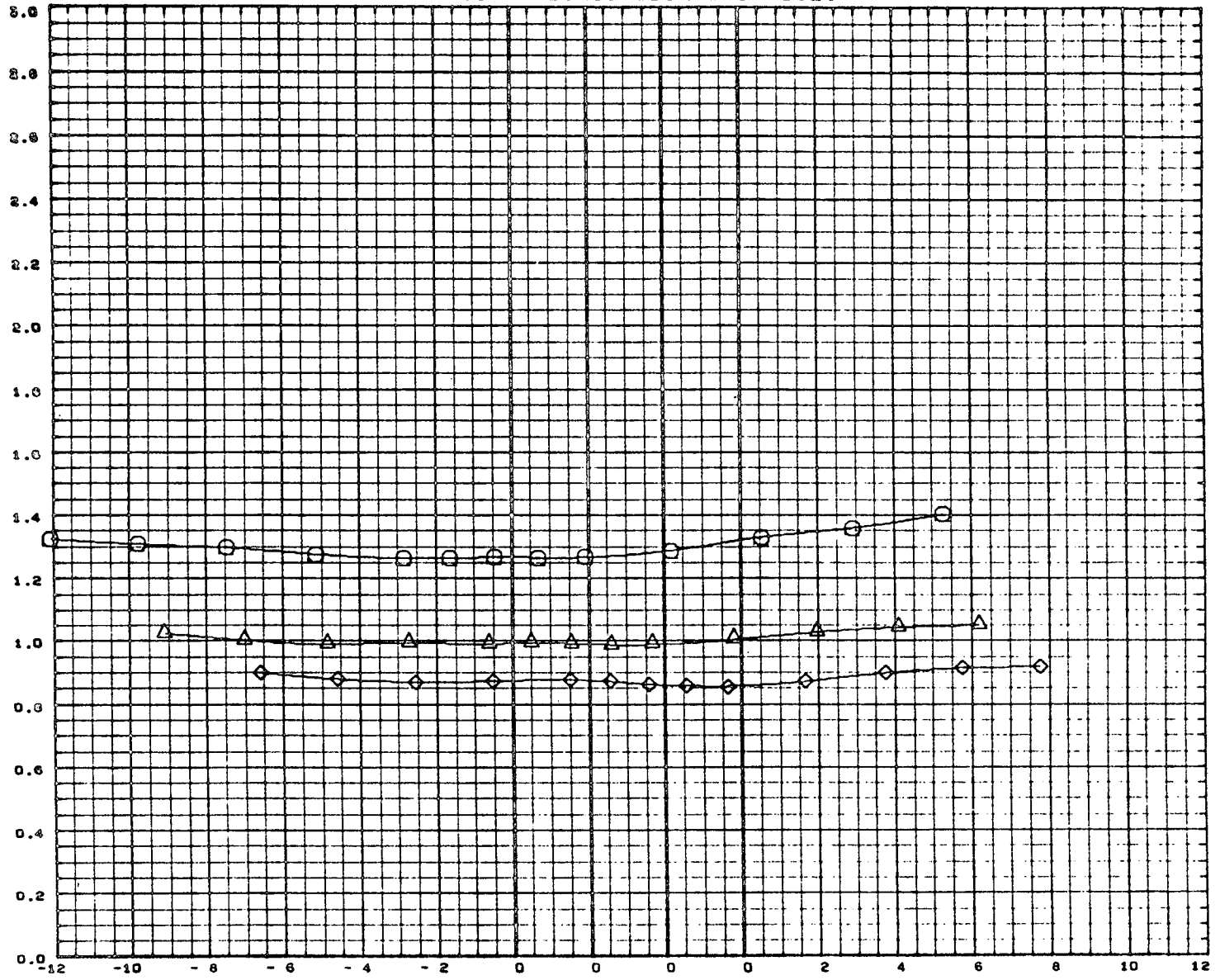
BETA	0.000	PHI	0.000
WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



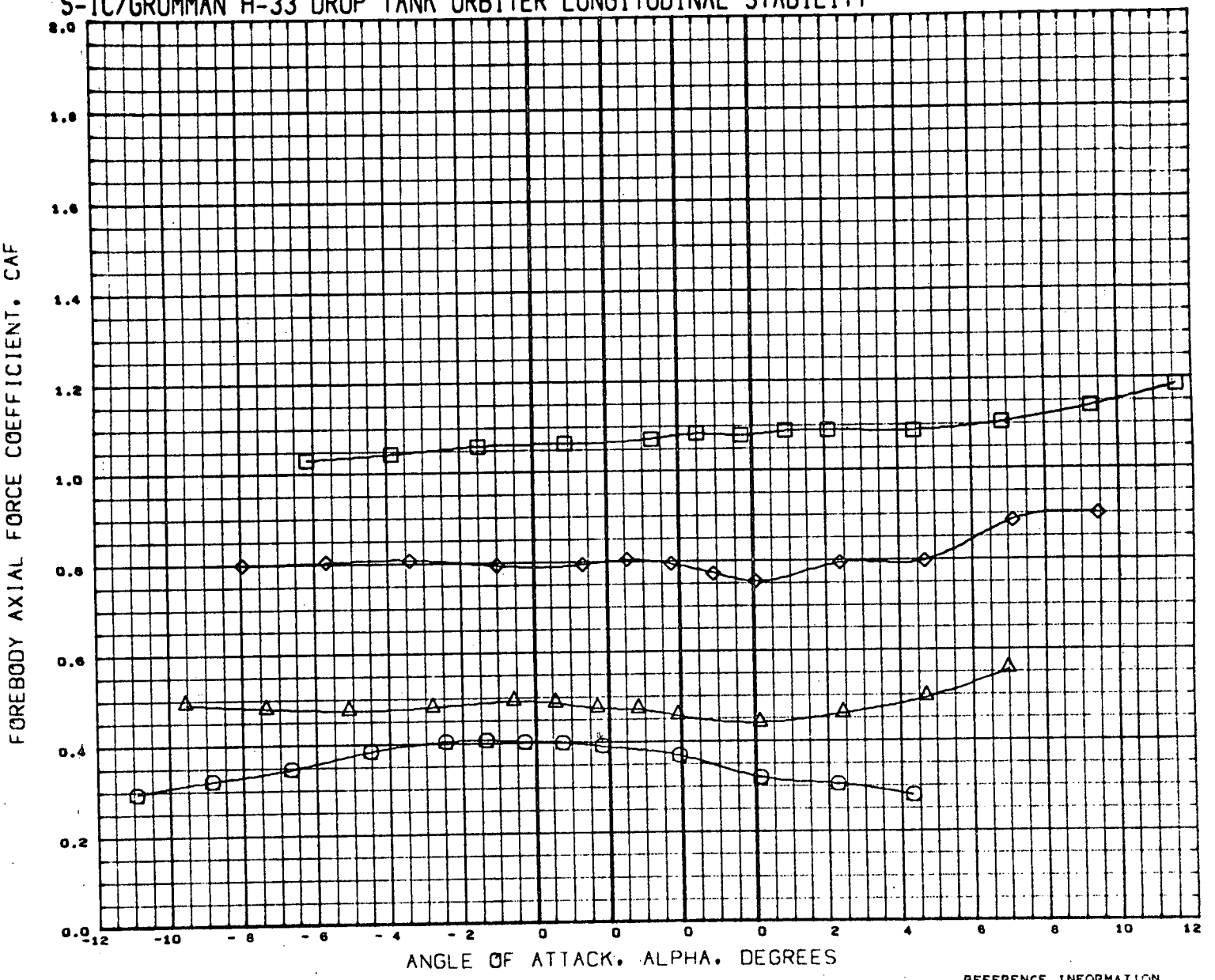
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.966	BETA	0.000	PHI	0.000
△	3.480	WNGIN	0.000		
◇	4.959				

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



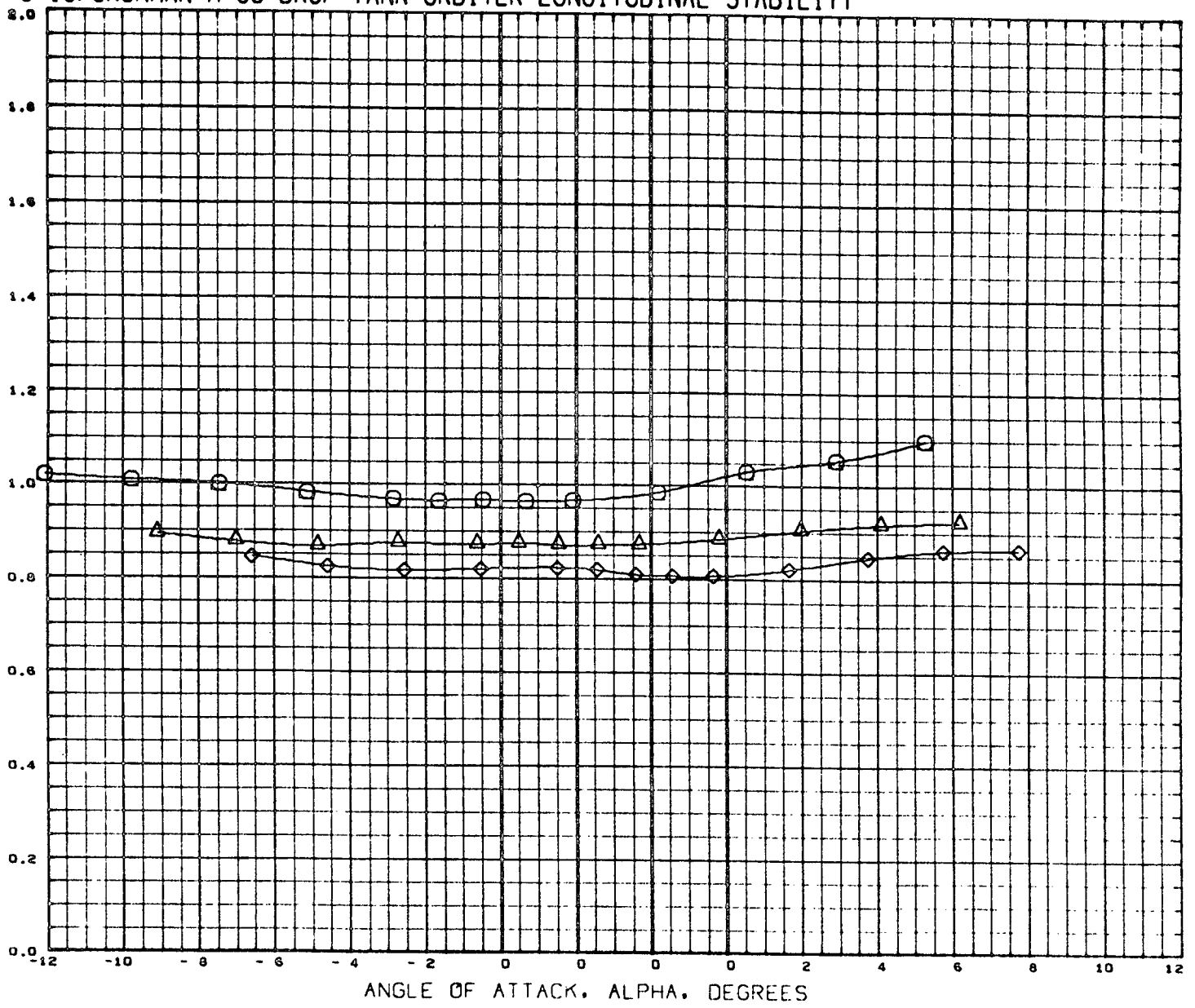
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.599	BETA	0.000	PHI	0.000
△	0.901	WNGIN	0.000		
◇	0.998				
□	1.203				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



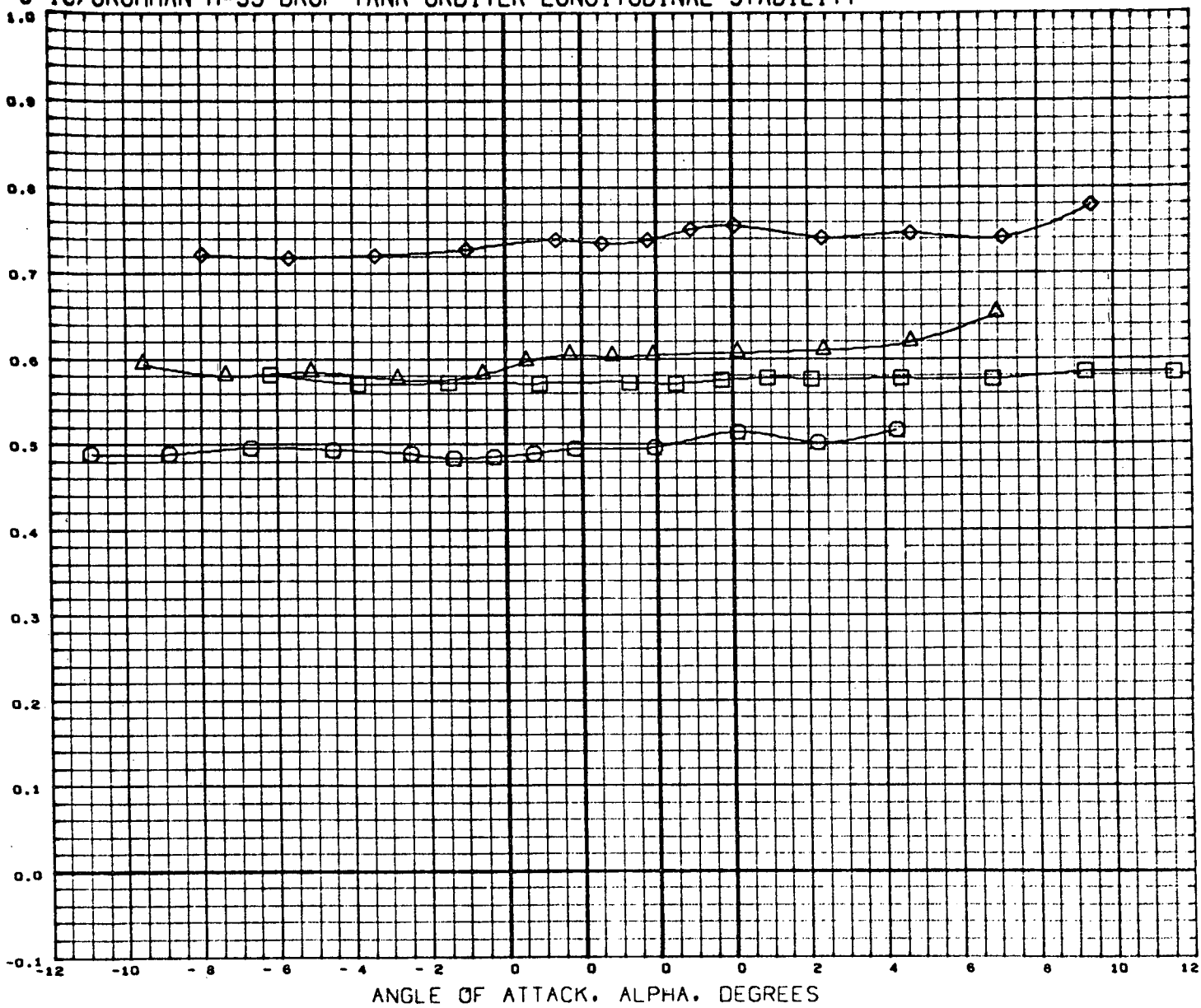
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.966	BETA	0.000	PHI	0.000
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

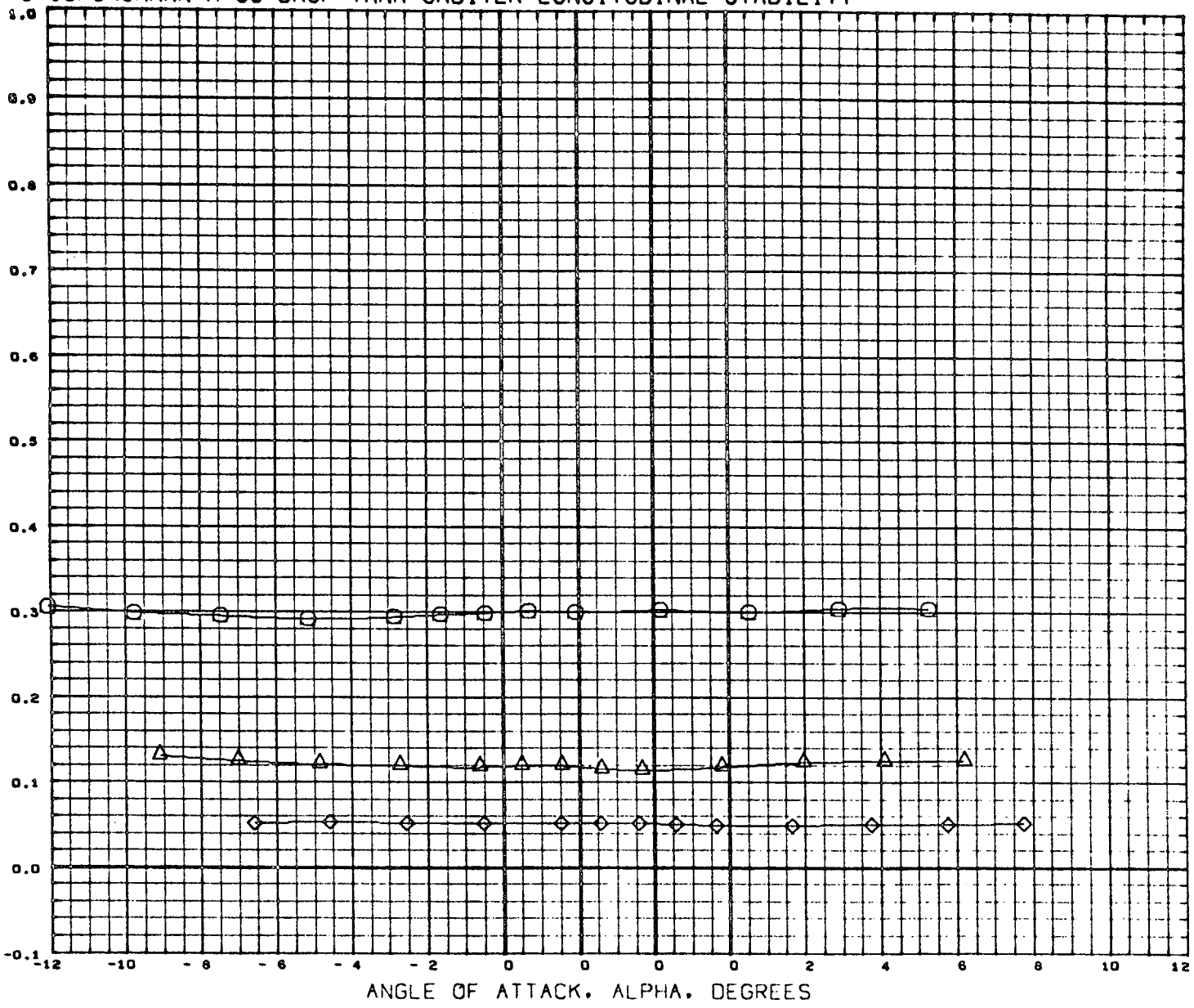


SYMBOL	MACH	PARAMETRIC VALUES			
○	0.599	BETA	0.000	PHI	0.000
△	0.901	WNGIN	0.000		
◇	0.998				
□	1.203				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



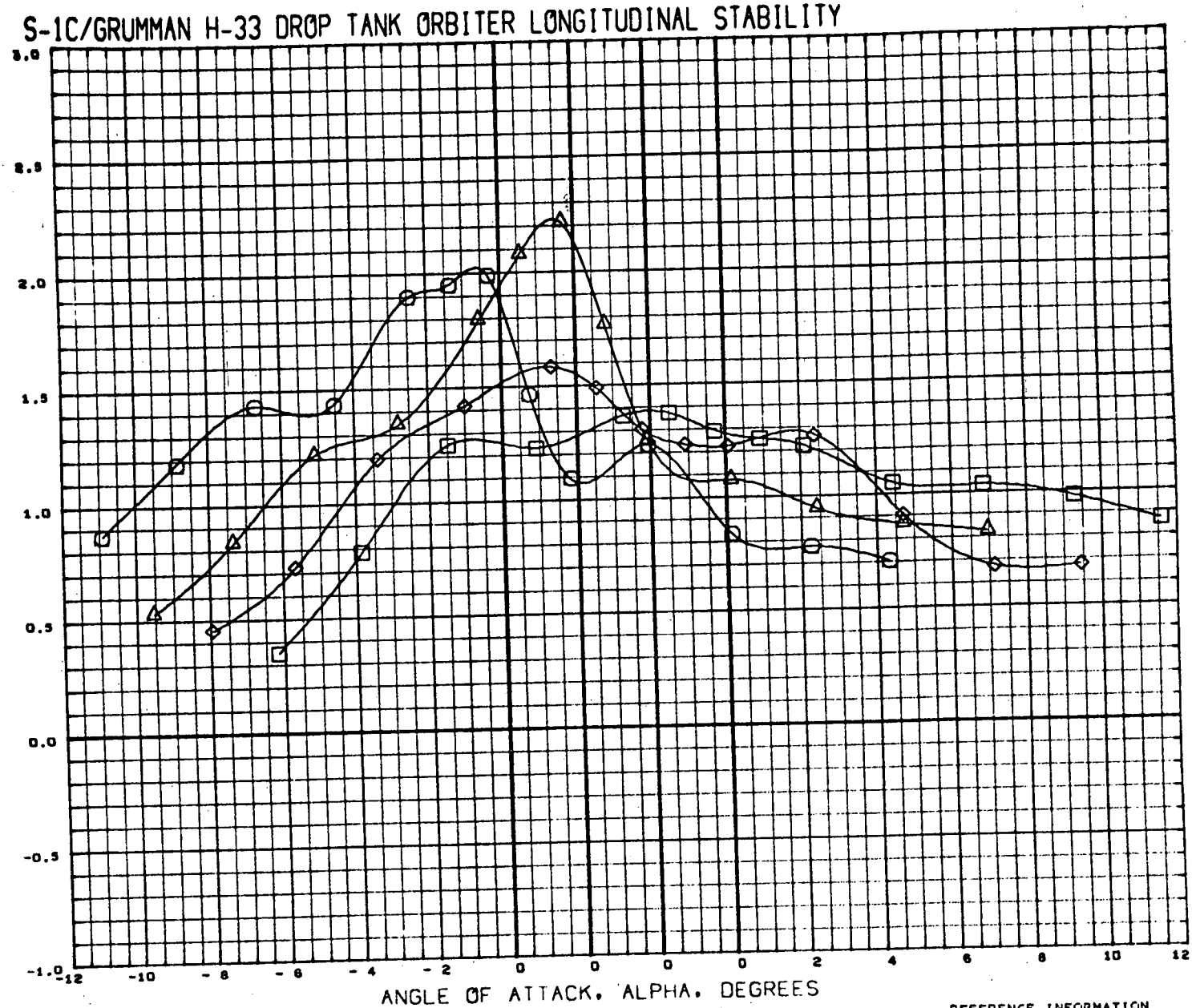
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.966	BETA	0.000	PHI	0.000
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH
○	0.599
△	0.901
◇	0.998
□	1.203

PARAMETRIC VALUES

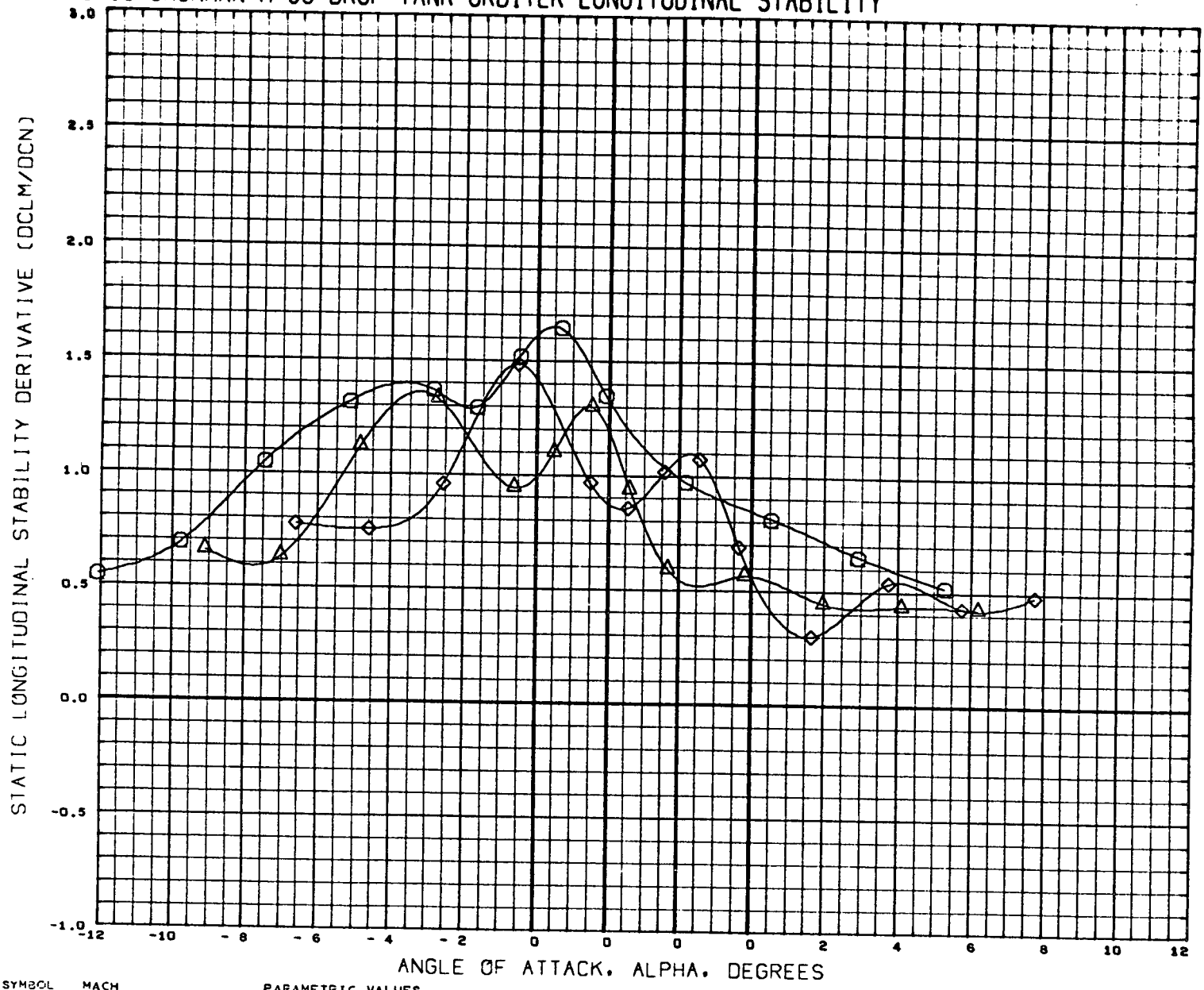
BETA	0.000	PHI	0.000
WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-IC/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



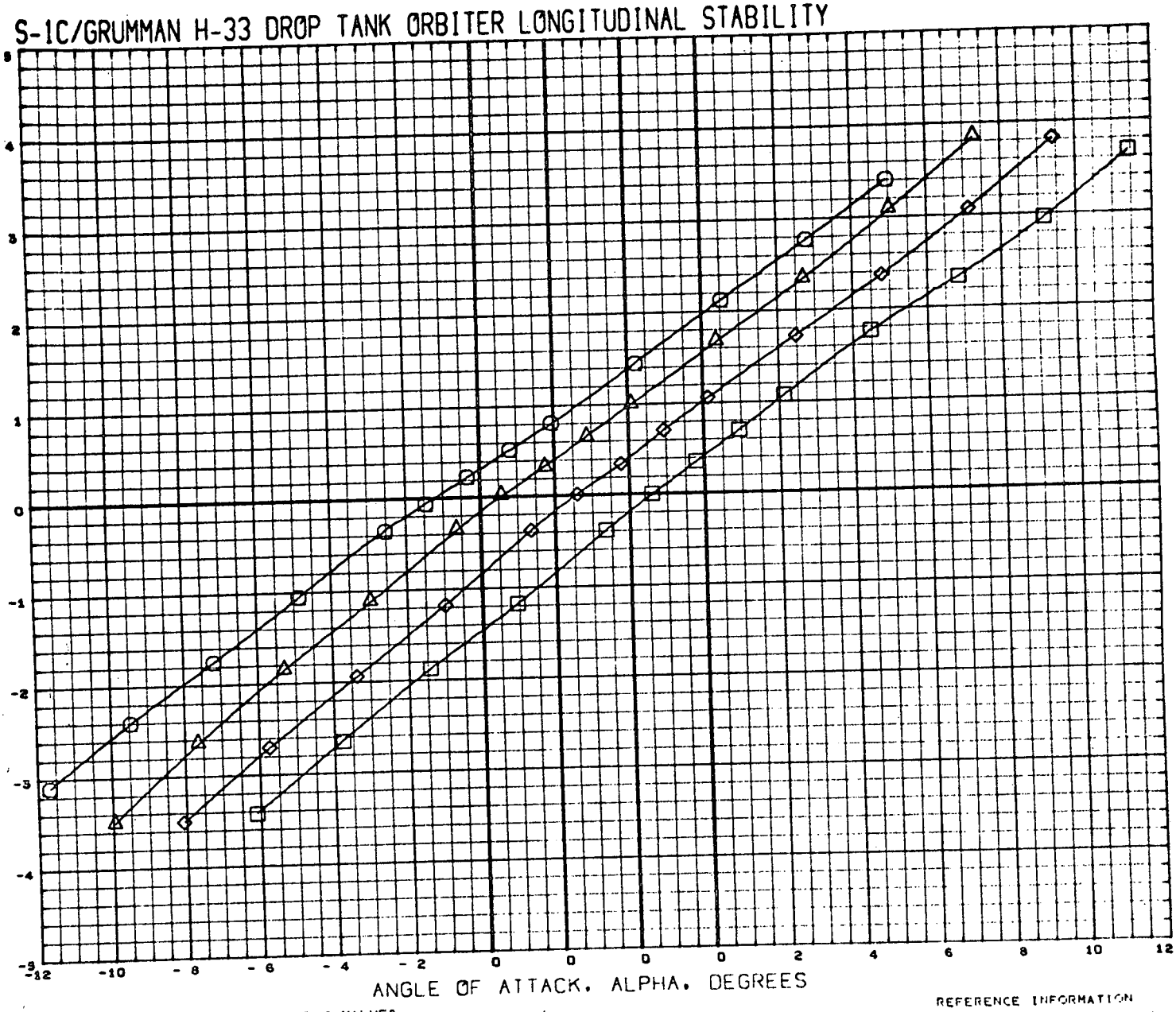
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.966	BETA	0.000	PHI	0.000
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



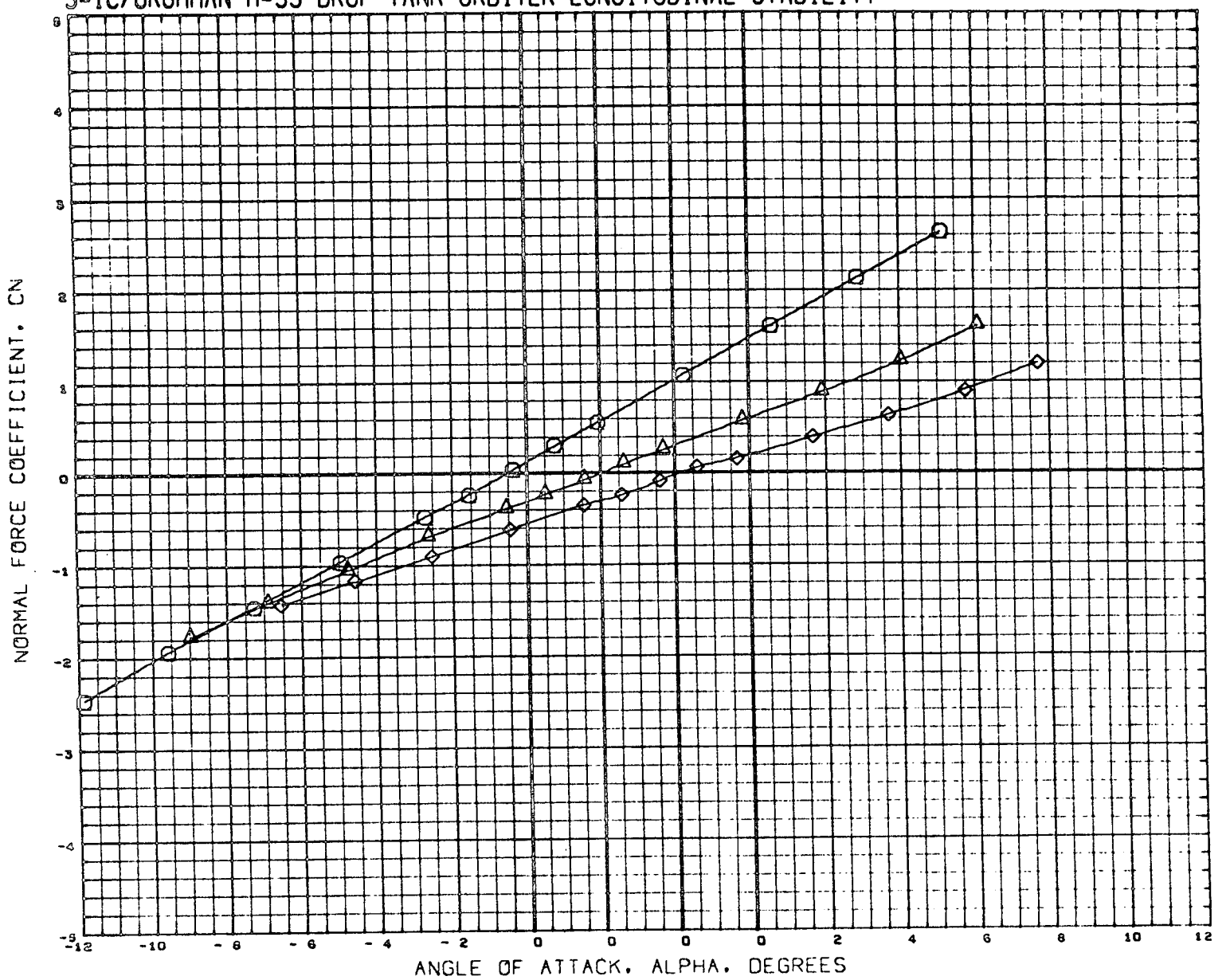
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.903	BETA	0.000	PHI	0.000
△	1.000	WNGIN	0.000		
◇	1.099				
□	1.198				

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-IC/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



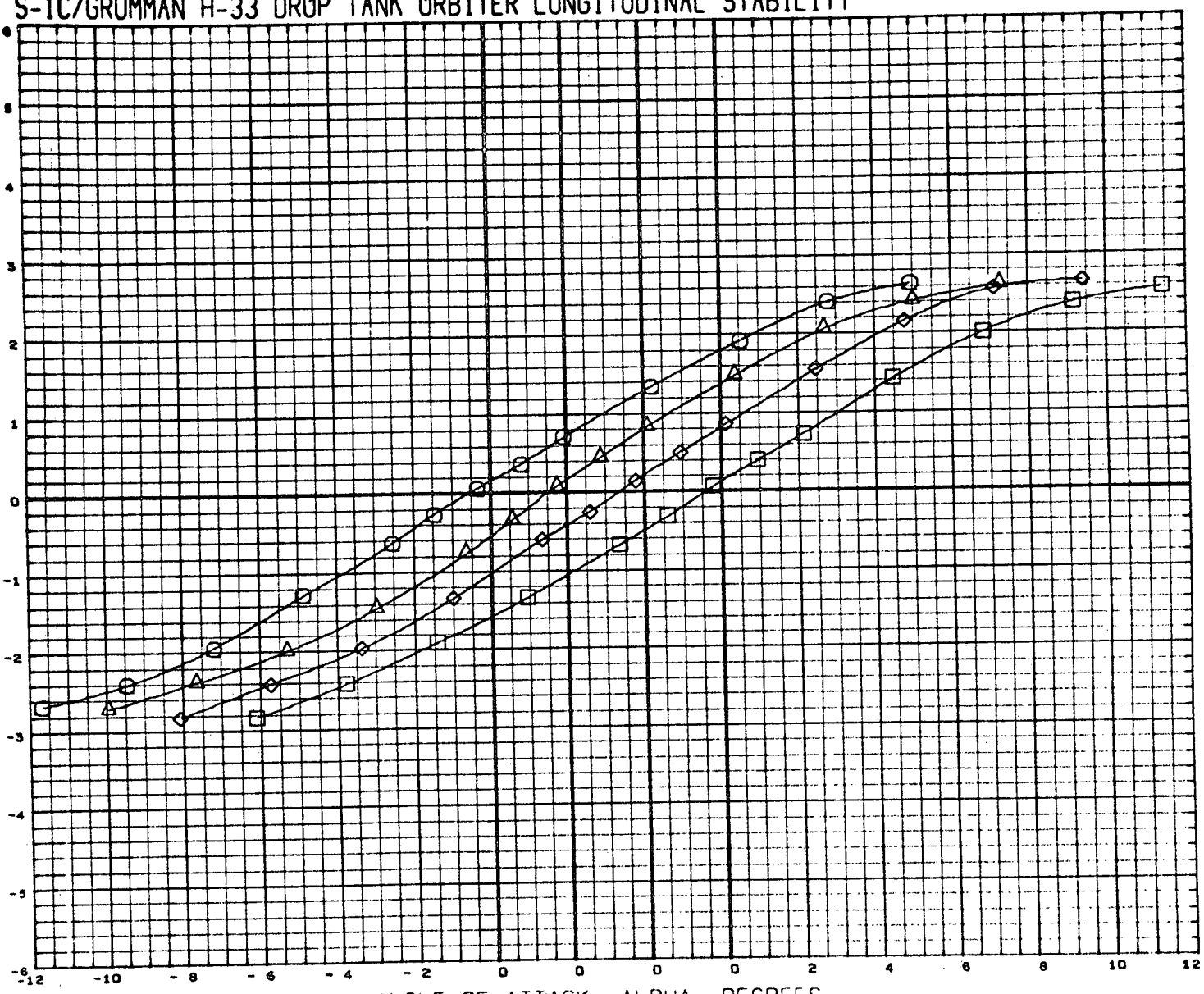
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.965	BETA	0.000	PHI	0.000
△	3.480	WNGIN	0.000		
◇	4.959				

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



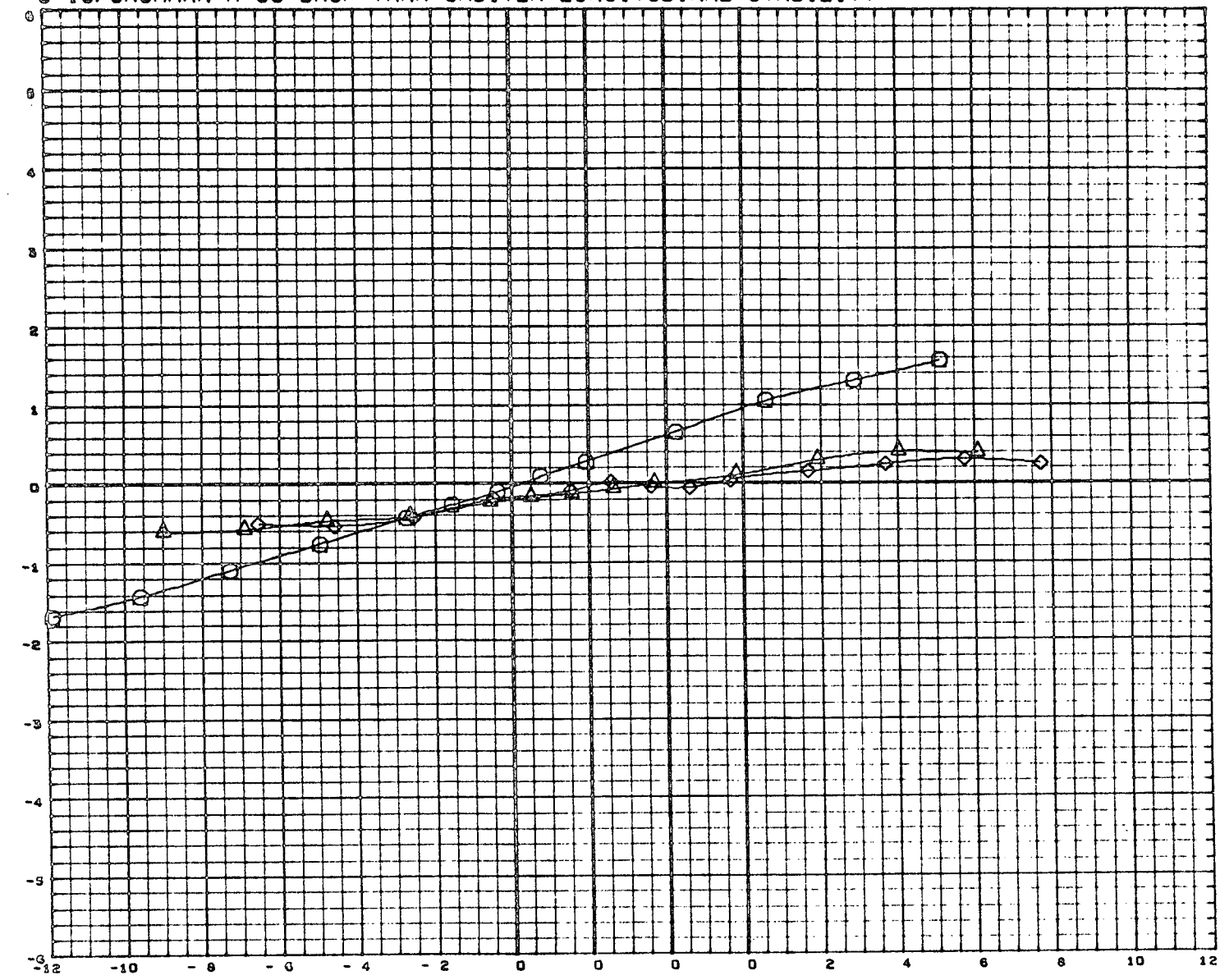
MSOL	MACH		PARAMETRIC VALUES		
○	0.903	BETA	0.000	PHI	0.000
△	1.000	WBGIN	0.000		
◇	1.099				
□	1.198				

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



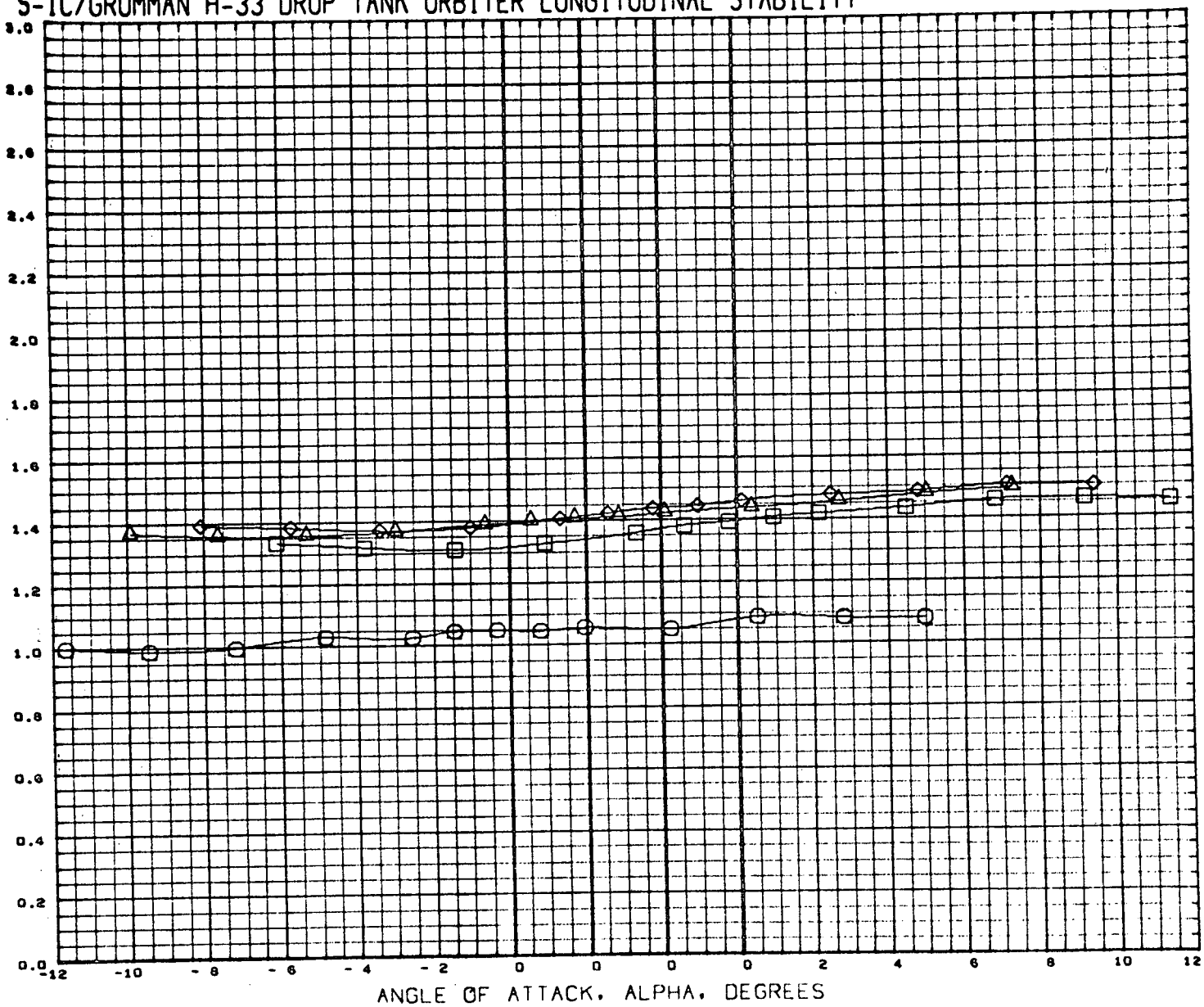
MODL	MACH	PARAMETRIC VALUES			
○	1.965	BETA	0.000	PHI	0.000
△	3.480	WNGIN	0.000		
◇	4.959				

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH
□	0.903
◇	1.000
△	1.099
○	1.198

PARAMETRIC VALUES

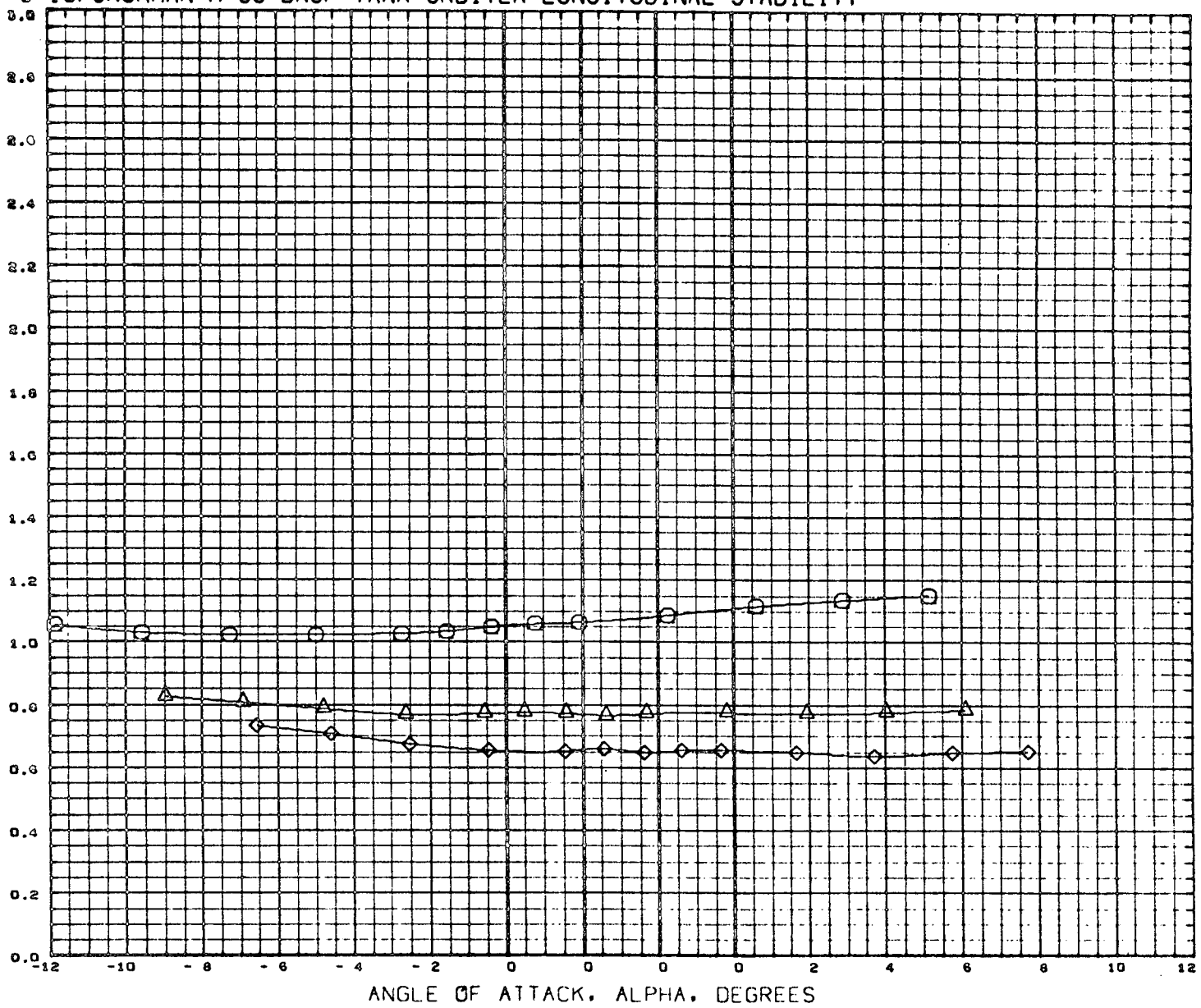
BETA	0.000	PHI	0.000
WRIGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES		
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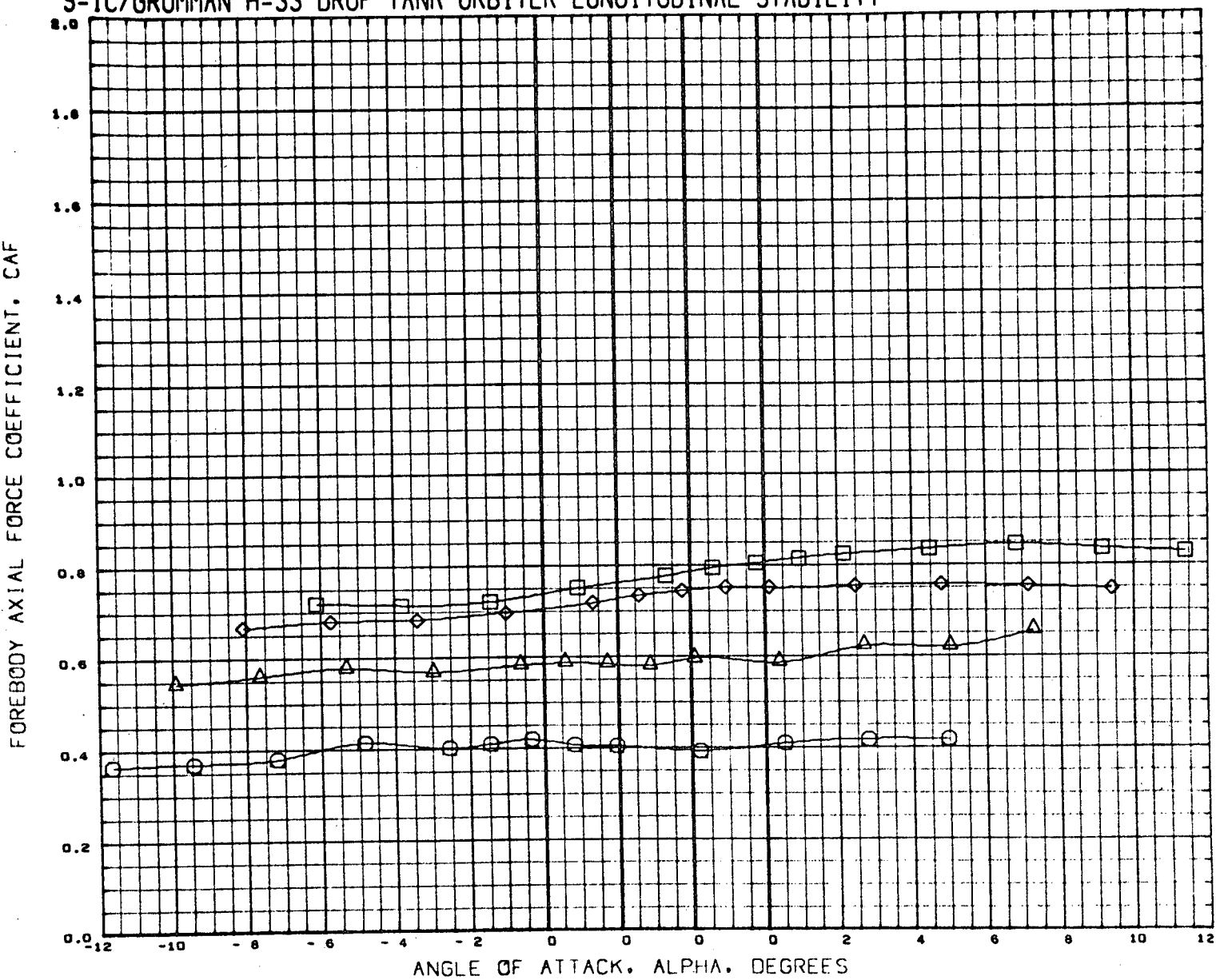
△	3.460	WNGIN	0.000		
◇	4.950				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



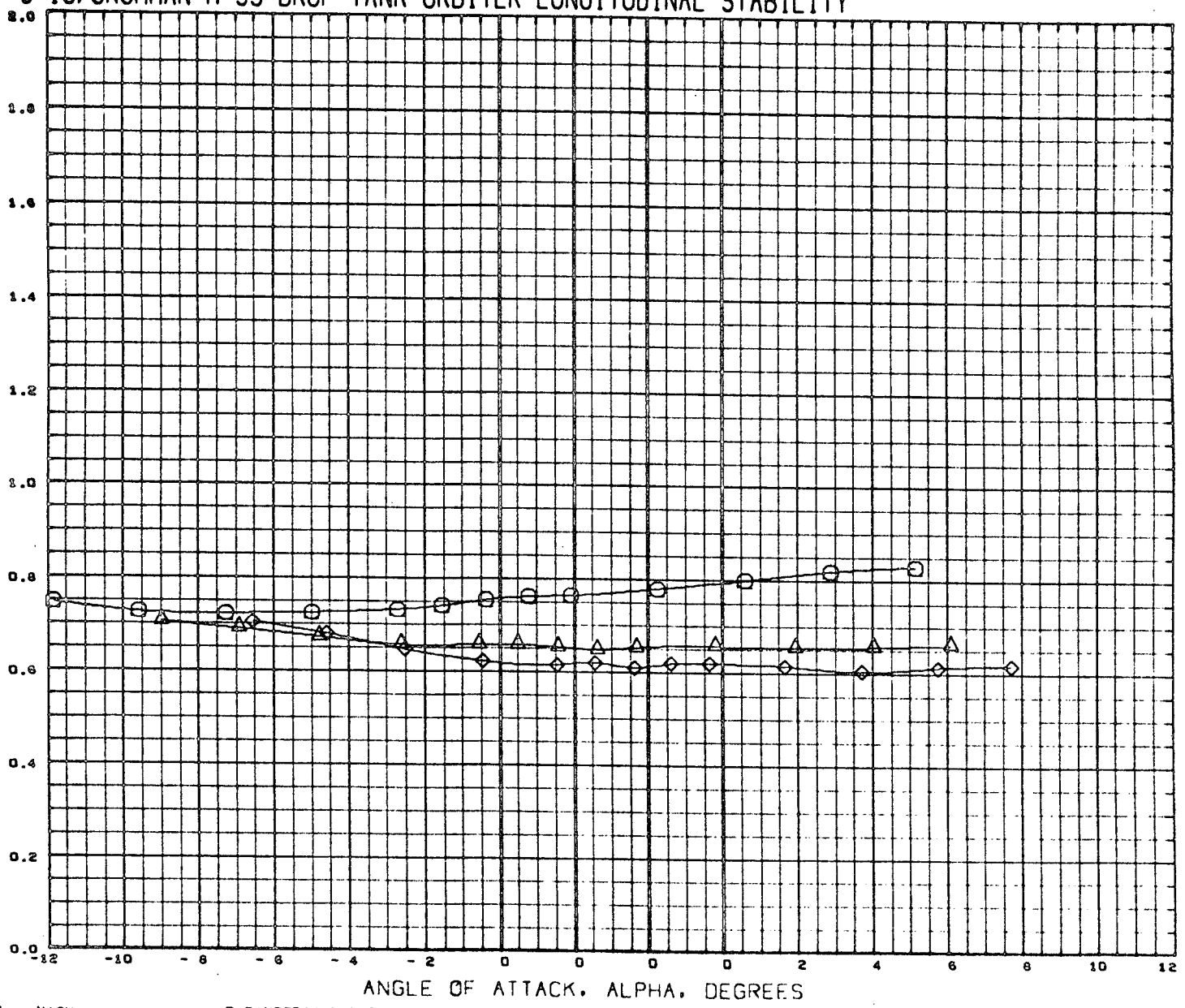
SYMBOL	MACH	PARAMETRIC VALUES			
□	0.903	BETA	0.000	PHI	0.000
△	1.000	WNGIN	0.000		
◇	1.099				
○	1.198				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



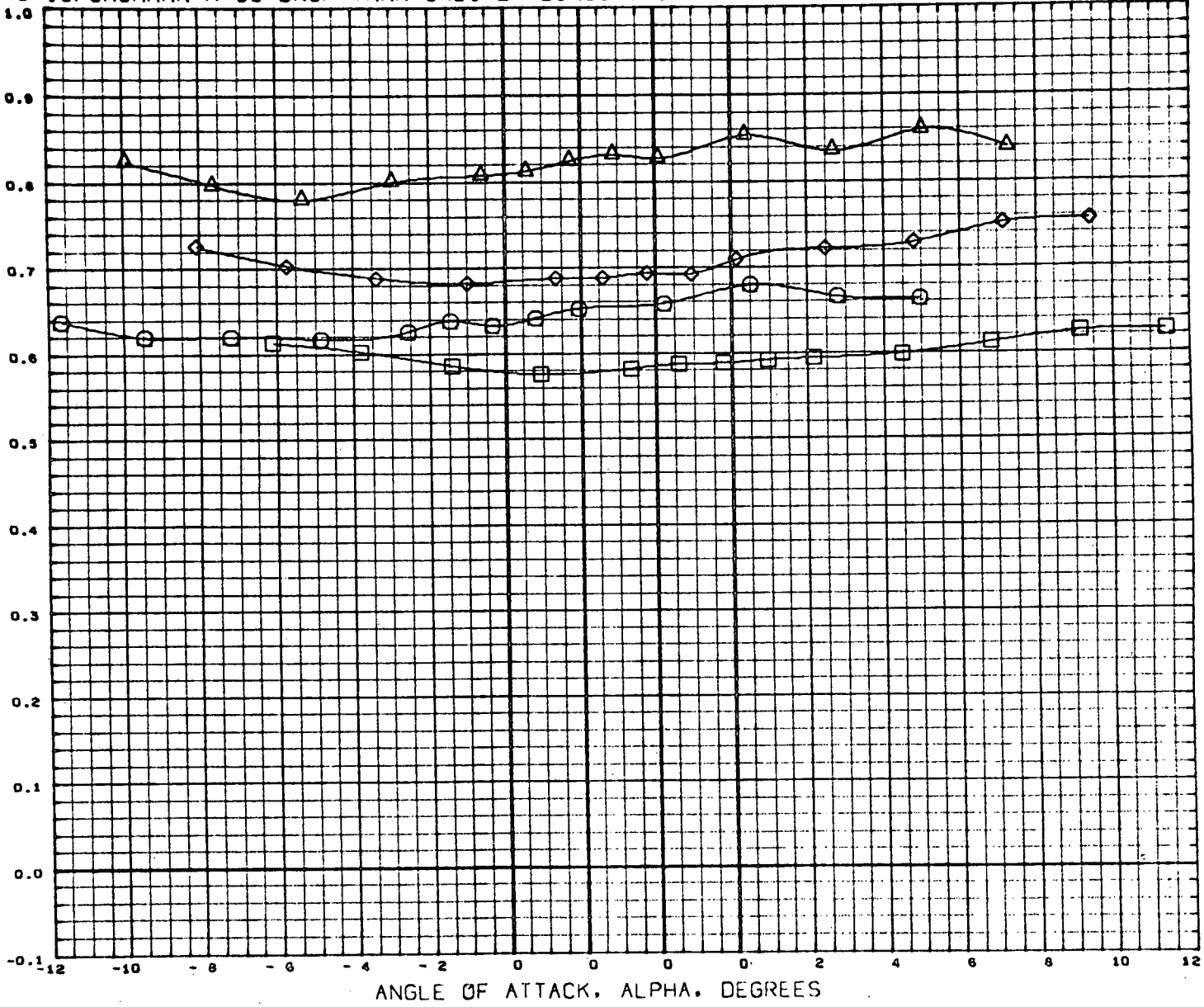
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.965	BETA	0.000	PHI	0.000
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
○	0.903	BETA	0.000	PHI	0.000
△	1.000	WNGIN	0.000		
◇	1.099				
□	1.198				

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
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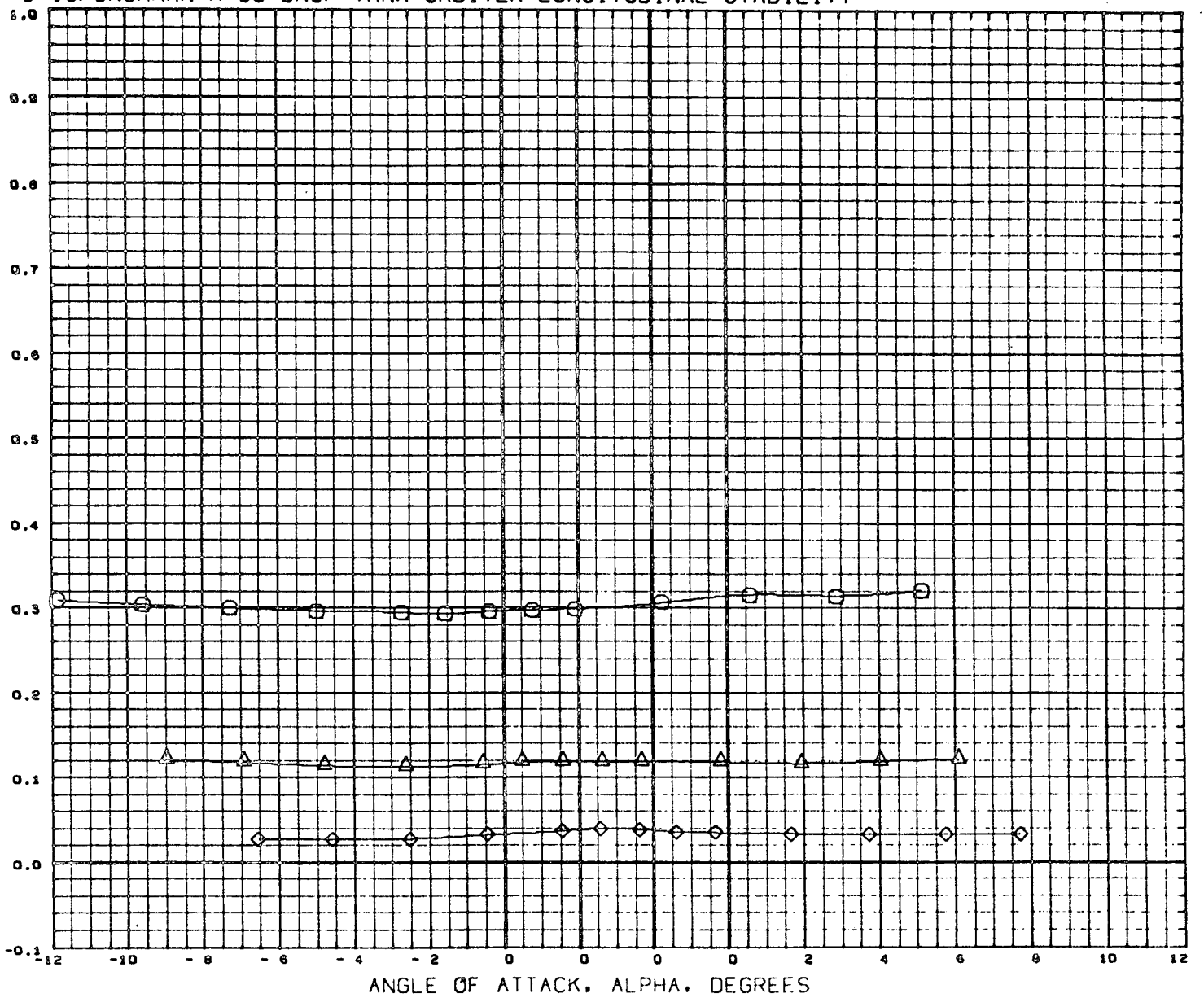
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



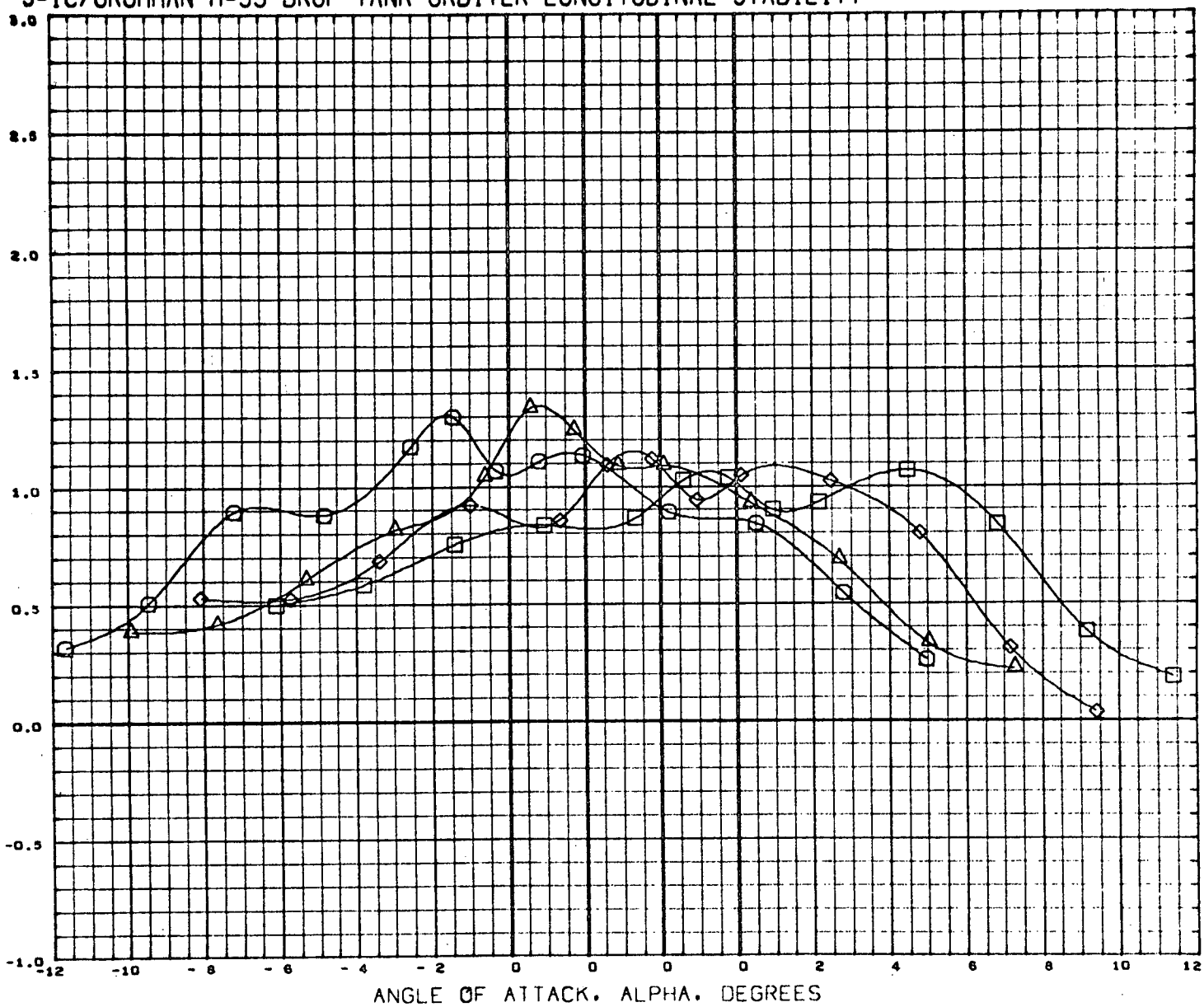
SYMBOL	MACH	PARAMETRIC VALUES			
	1.965	BETA	0.000	PHI	0.000
△	3.480	WIGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

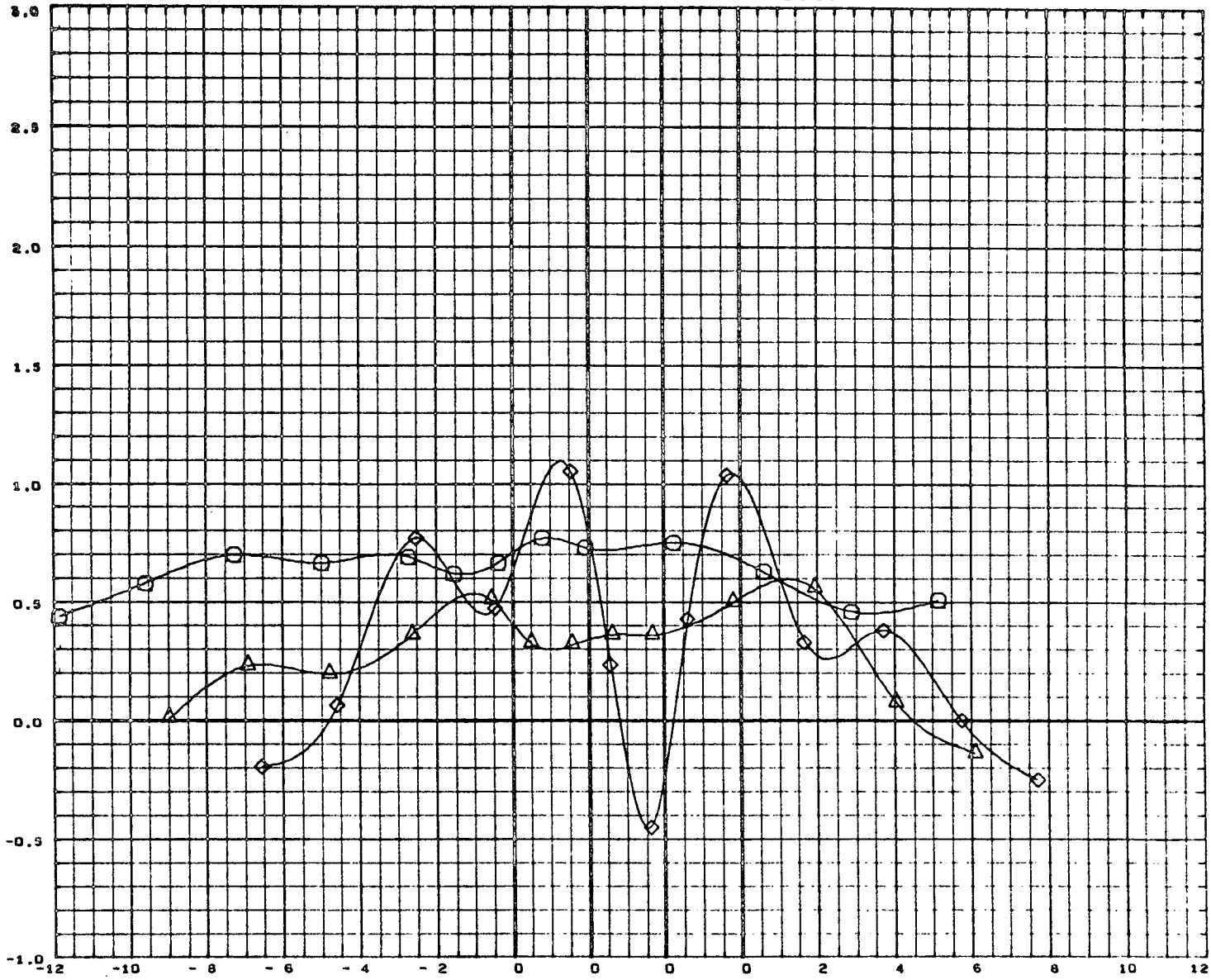


SYMBOL	MACH		PARAMETRIC VALUES		
○	0.903	BETA	0.000	PHI	0.000
△	1.000	WNGIN	0.000		
◇	1.099				
□	1.198				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



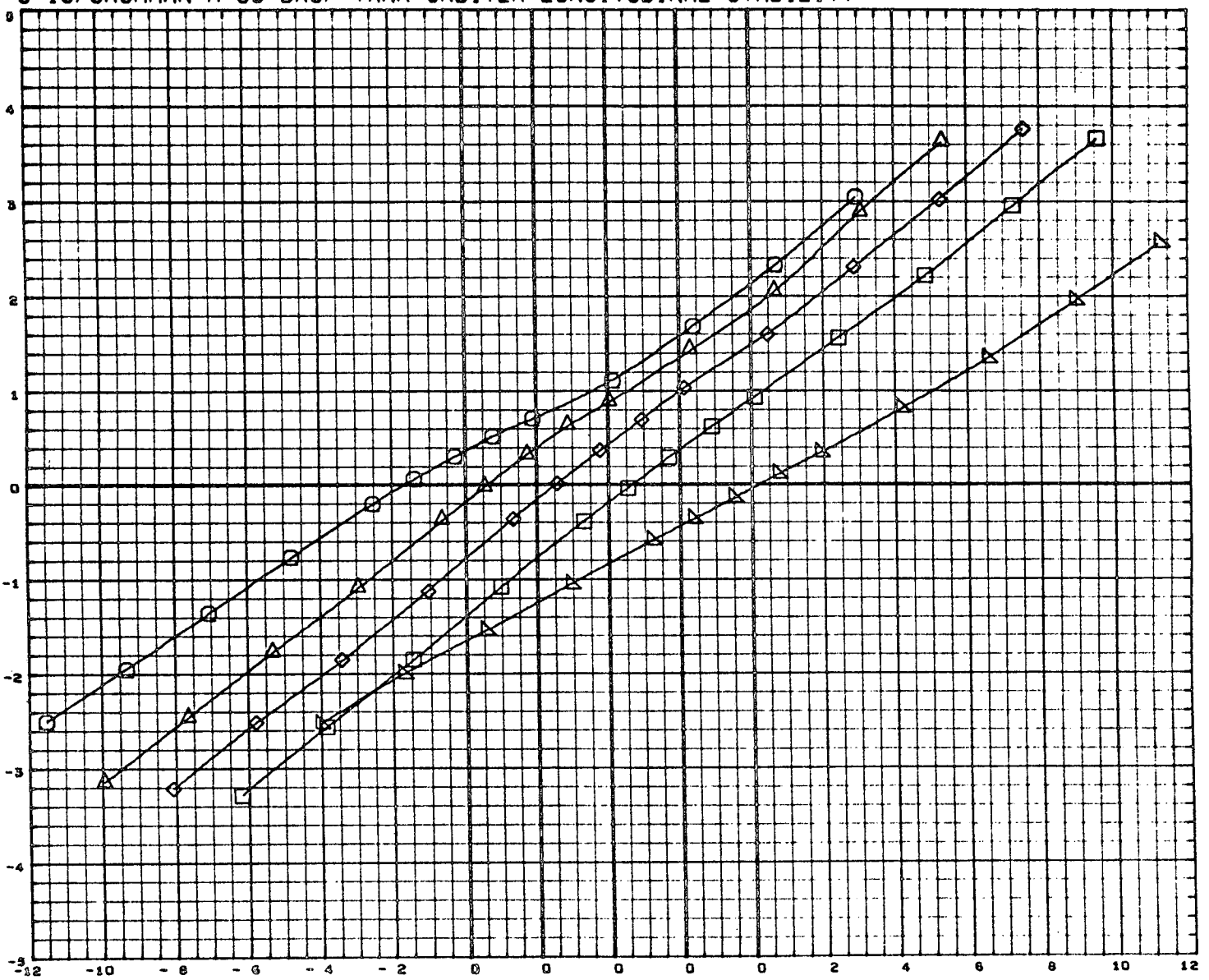
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.965	BETA	0.000	PHI	0.000
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
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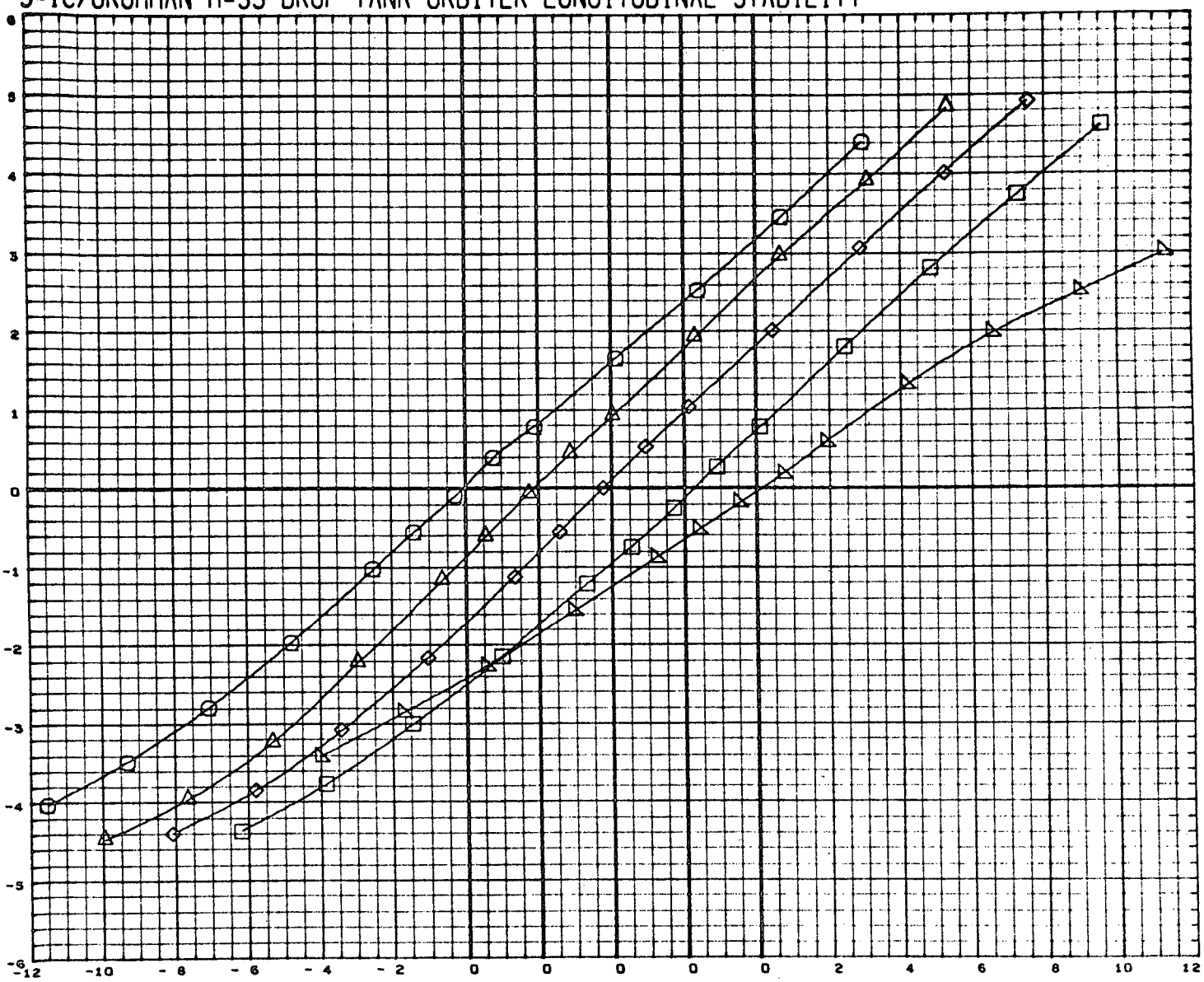
△	0.936	WNGIN	0.000		
◇	1.100				
□	1.196				
▽	1.964				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



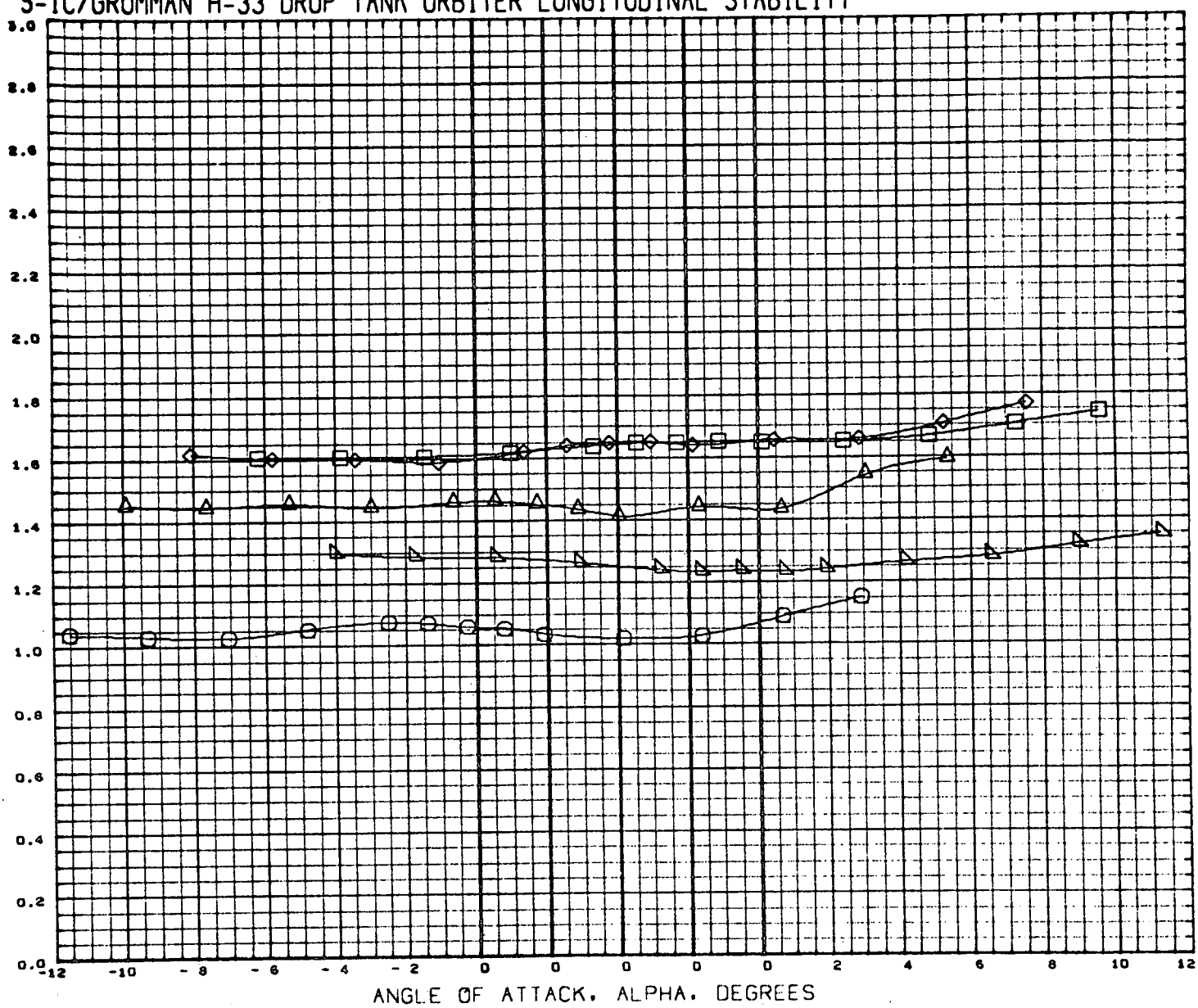
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.897	BETA	0.000	PHI	0.000
△	0.936	WNGIN	0.000		
◇	1.100				
□	1.196				
▽	1.964				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



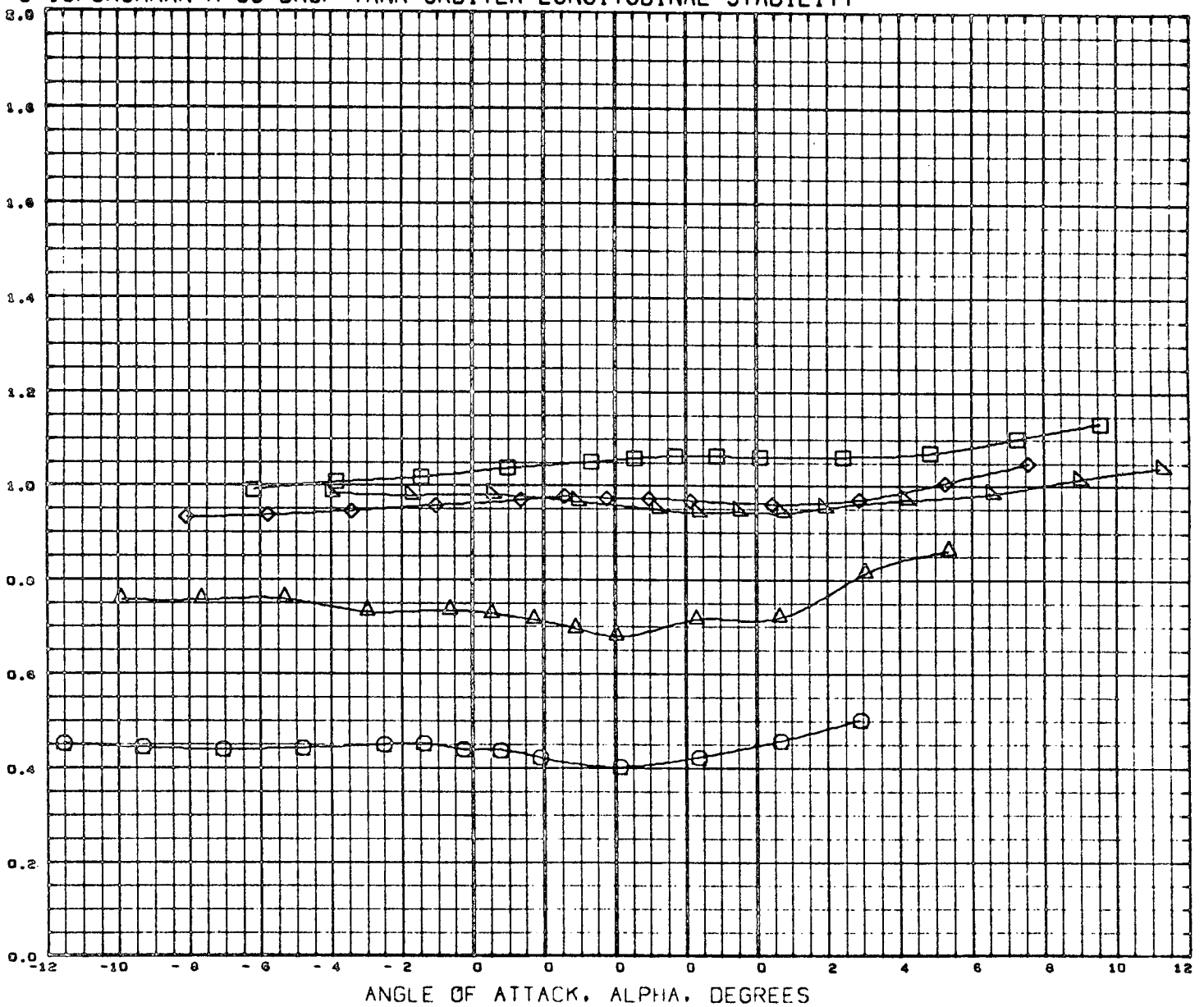
SYMBOL	MACH		PARAMETRIC VALUES		
□	0.697	BETA	0.000	PHI	0.000
△	0.996	WNGIN	0.000		
◇	1.100				
○	1.196				
	1.964				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



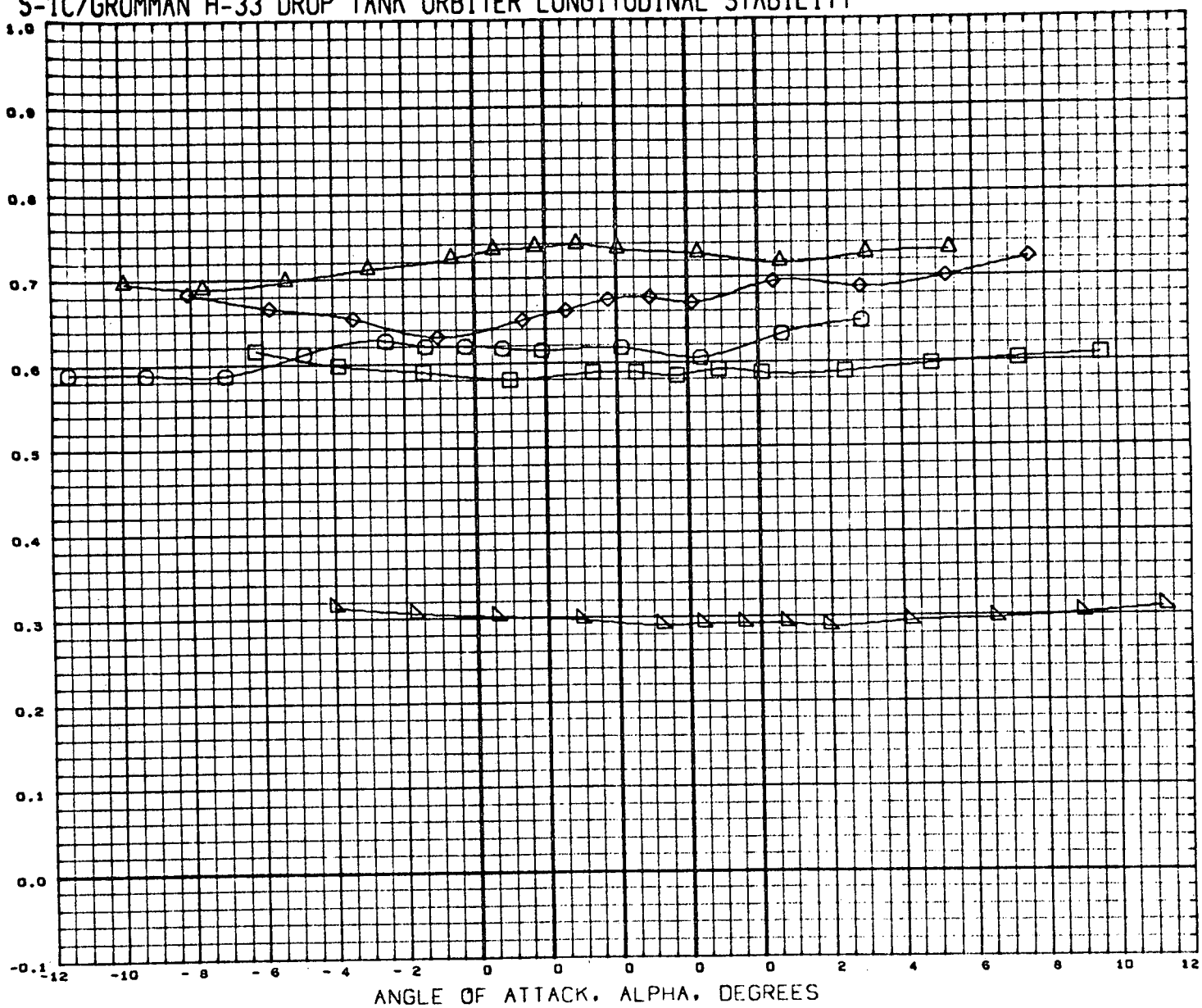
SYMBOL	MACH	PARAMETRIC VALUES			
□	0.897	BETA	0.000	PHI	0.000
◇	0.996	WNGIN	0.000		
△	1.100				
	1.196				
	1.964				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
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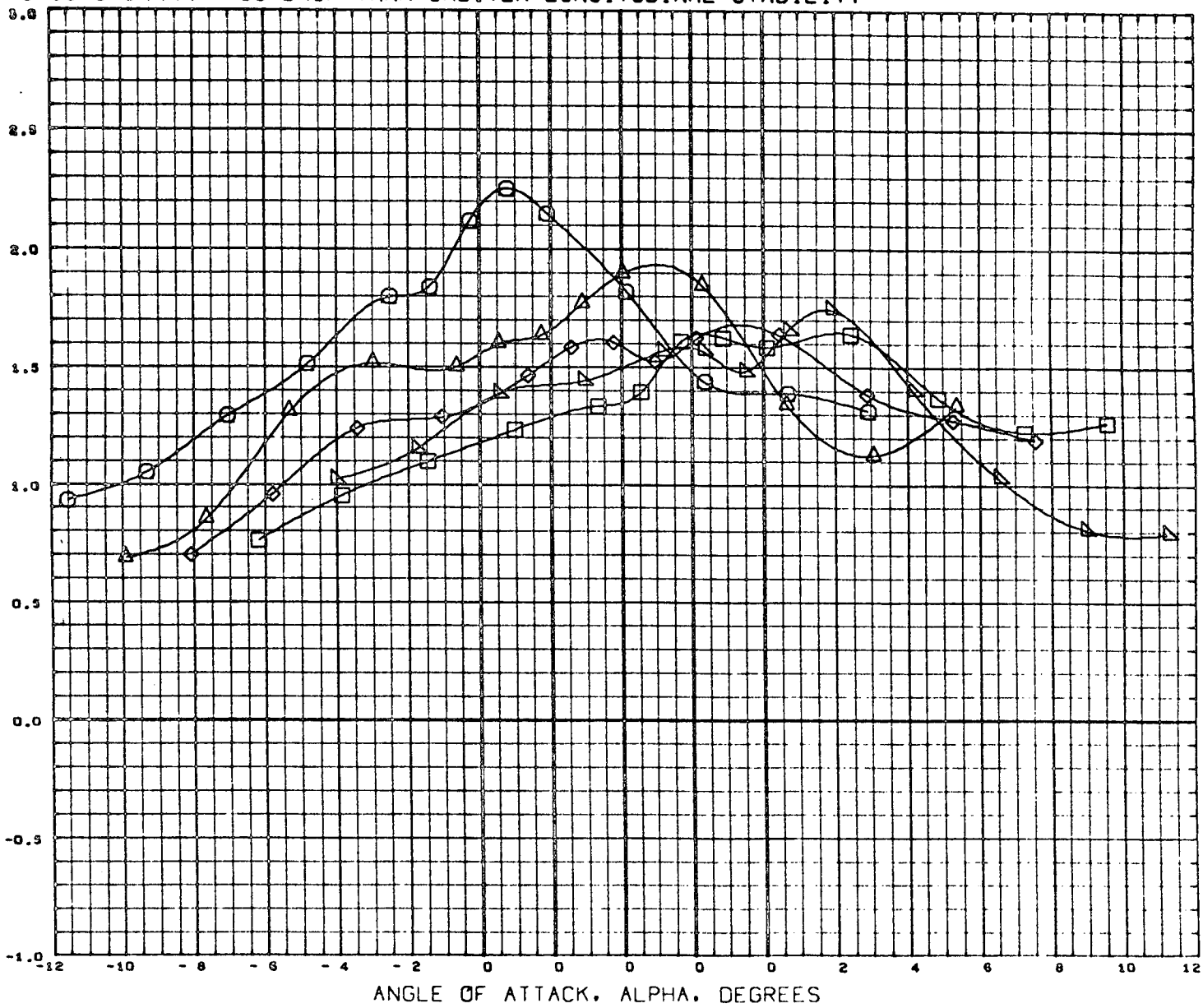
△	0.996	WBGIN	0.000		
◇	1.100				
□	1.196				
⟋	1.964				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



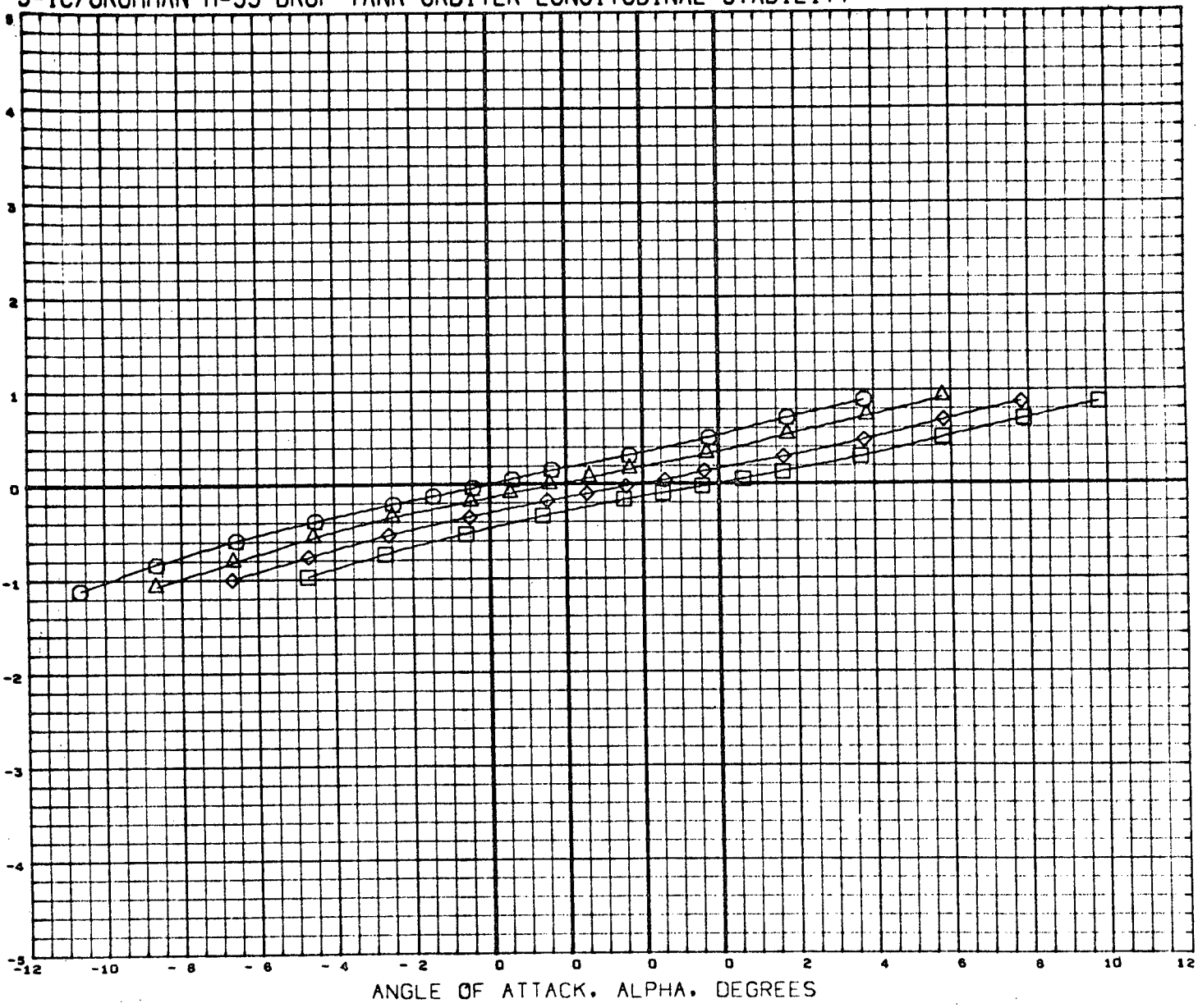
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.897	BETA	0.000	PHI	0.000
△	0.996	WNGIN	0.000		
◇	1.100				
□	1.196				
	1.964				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



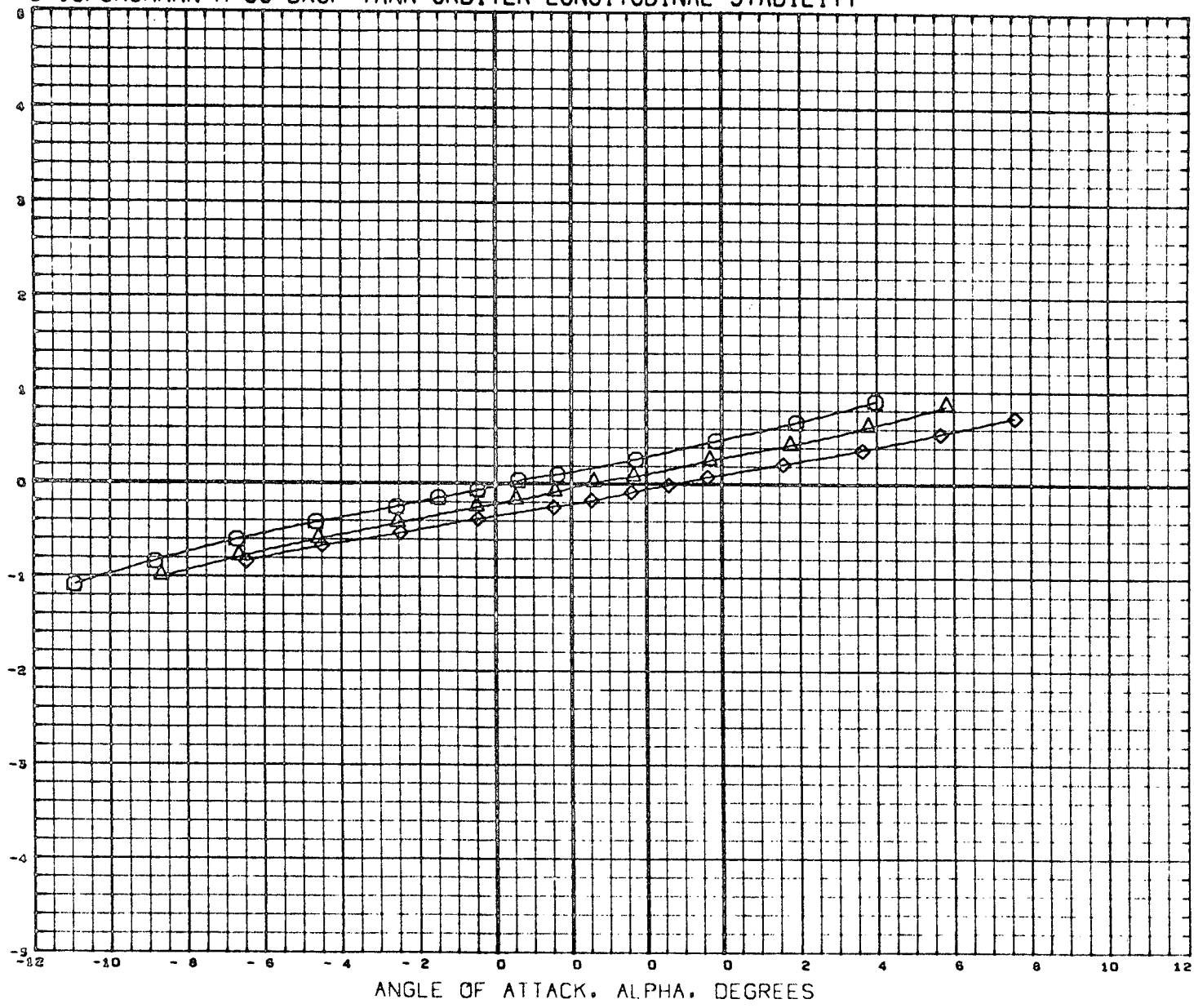
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.900	BETA	0.000	PHI	0.000
△	1.001	WNGIN	0.000		
◇	1.104				
□	1.205				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



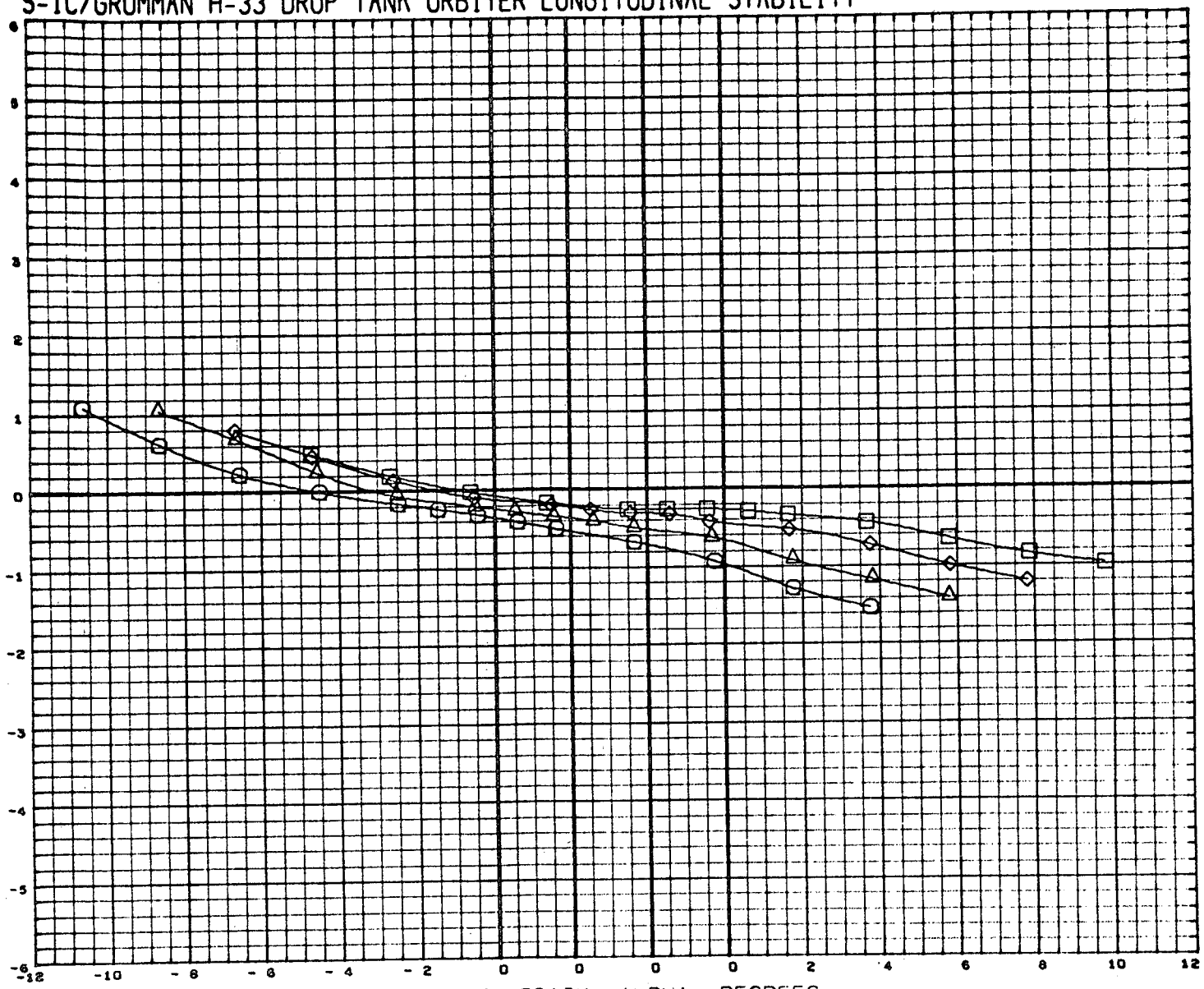
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.959	BETA	0.000	PHI	0.000
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



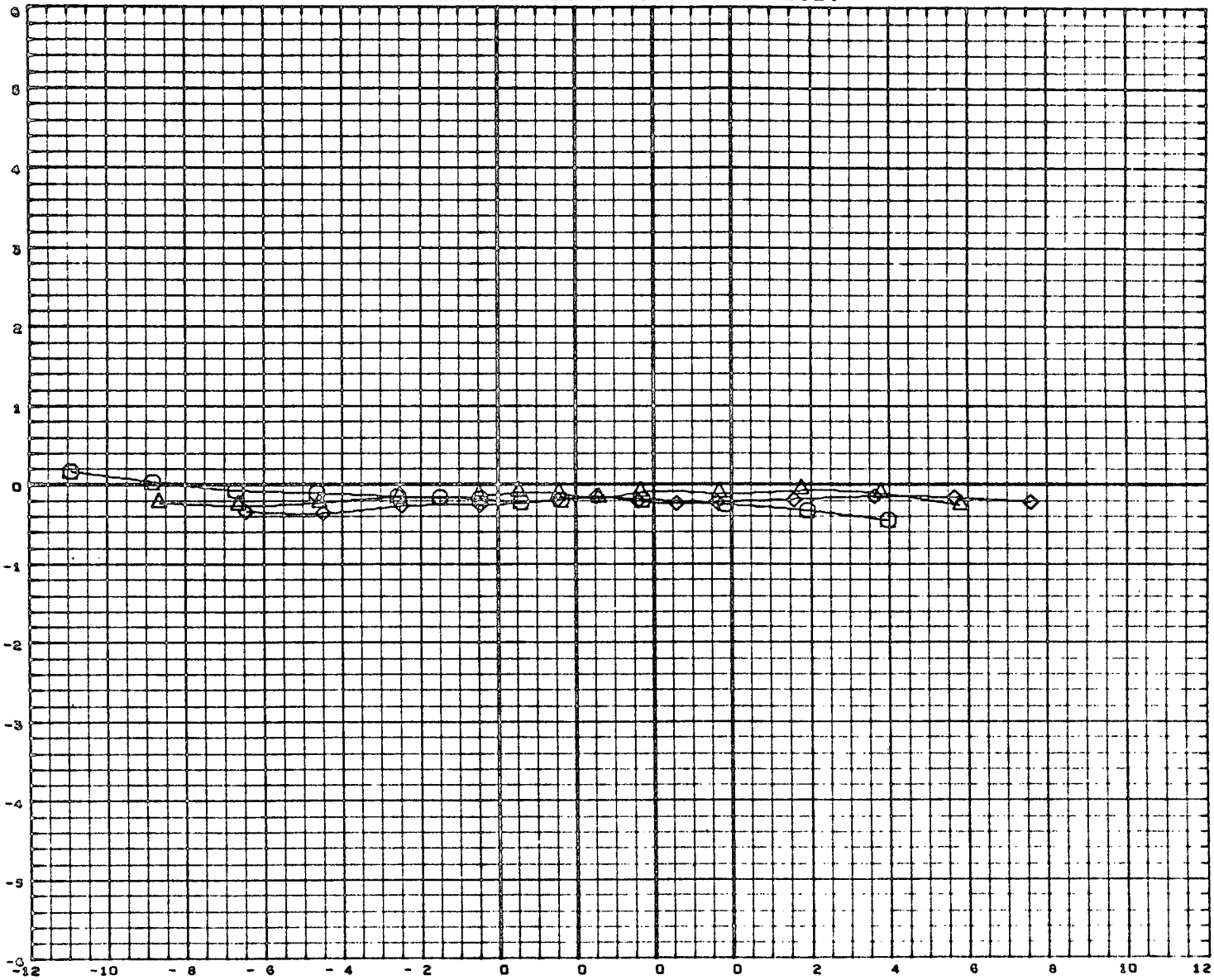
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.900	BETA	0.000	PHI	0.000
△	1.001	WNGIN	0.000		
◇	1.104				
□	1.205				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES		
○	1.959	BETA	0.000	PHI	0.000
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

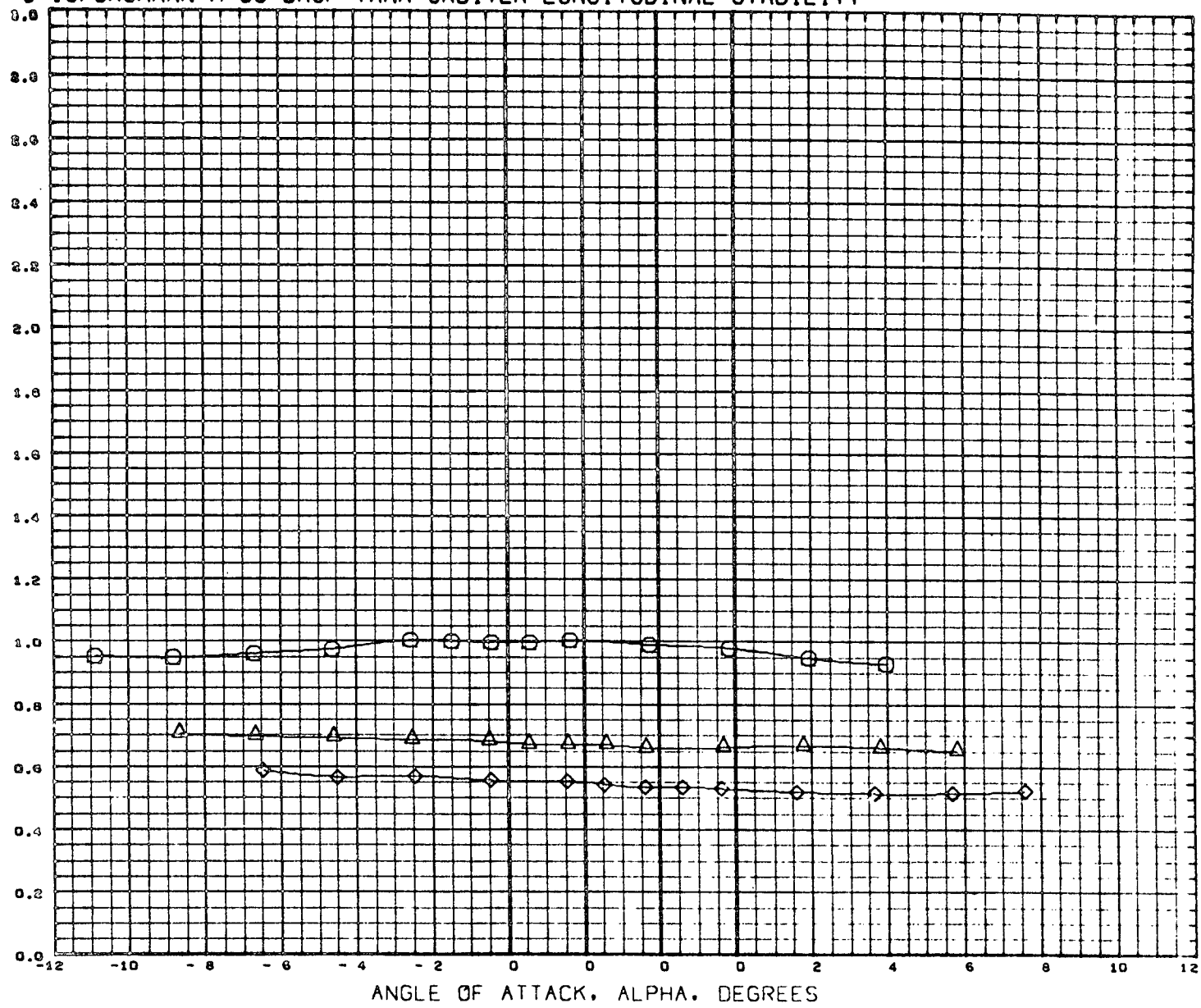
S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	BETA	0.000	PHI	0.000
△	1.001	WNGIN	0.000		
◇	1.104				
□	1.205				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES		
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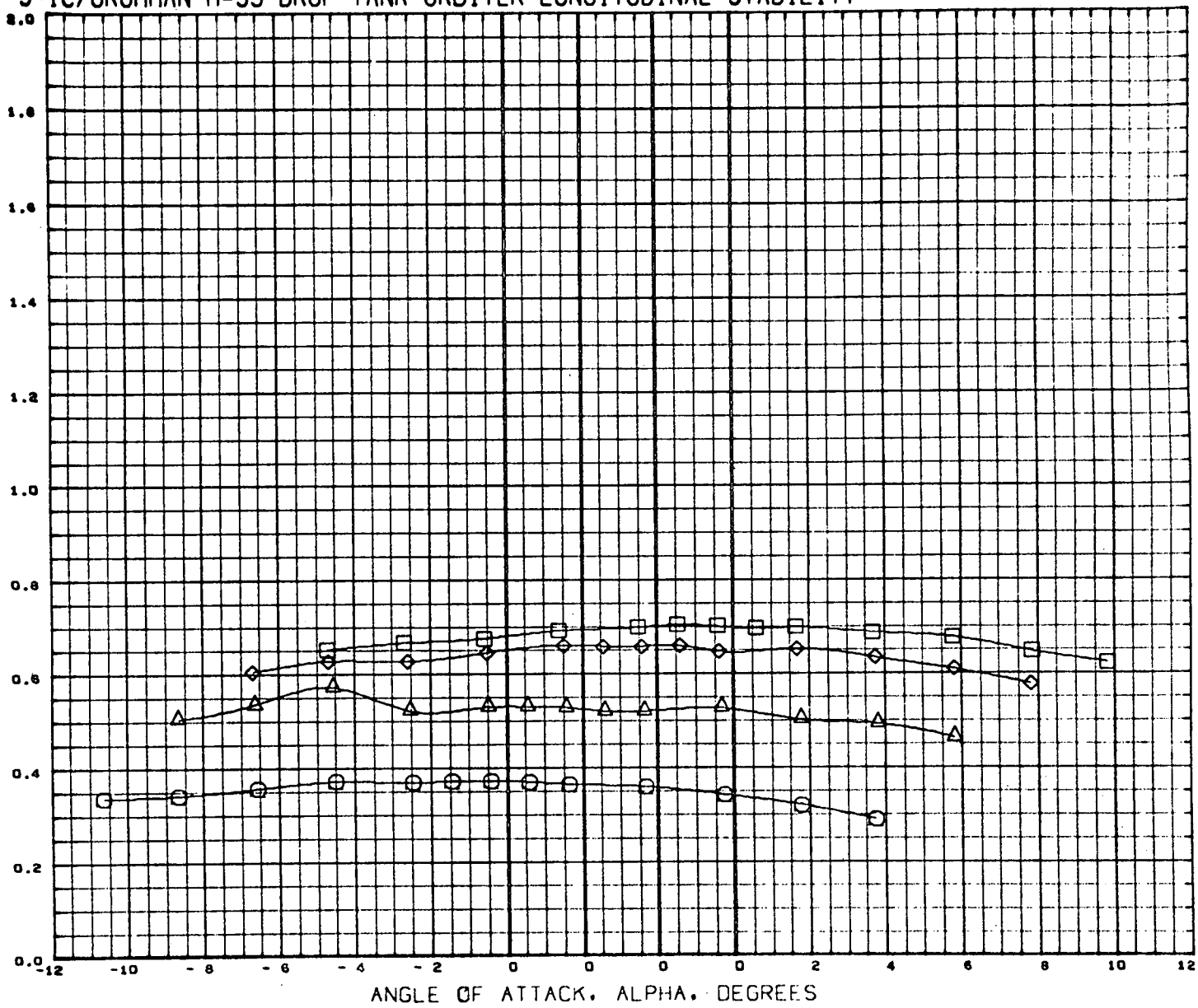
△	3.480	WIGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



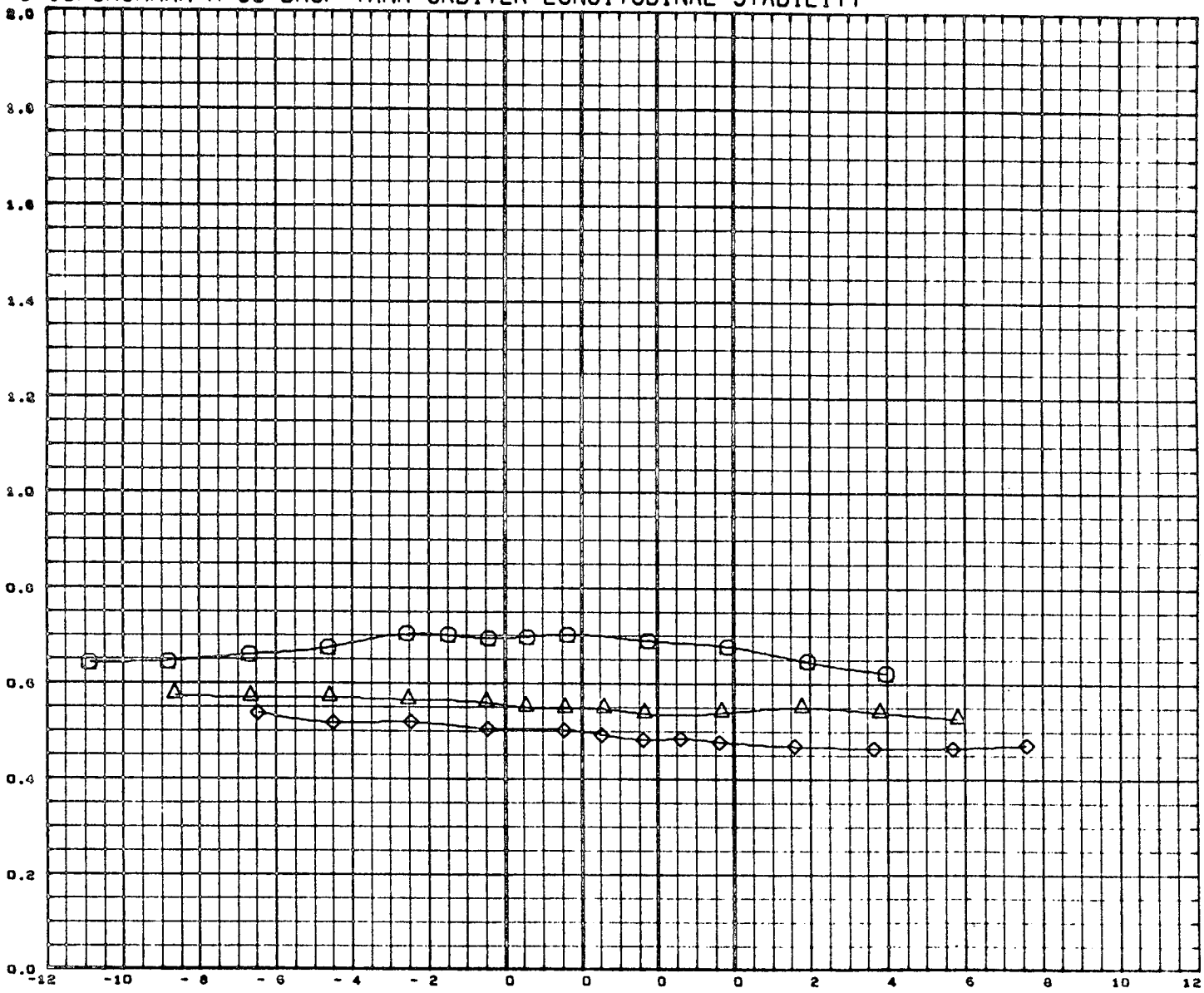
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	BETA	0.000	PHI	0.000
△	1.001	WNGIN	0.000		
◇	1.104				
□	1.205				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES		
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△	3.460	WNGIN	0.000		
◇	4.999				

REFERENCE INFORMATION

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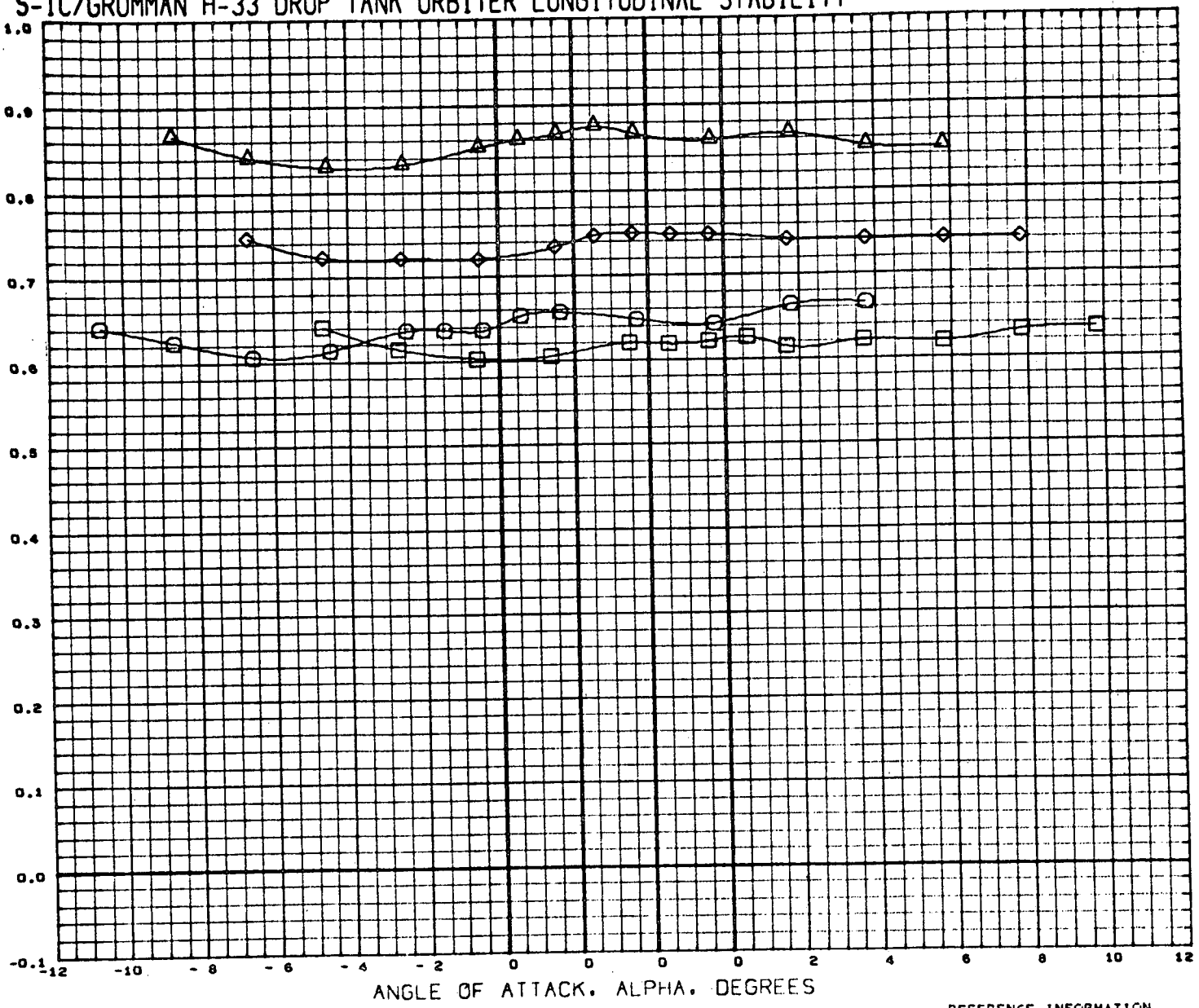
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES		
△	0.900	BETA	0.000	PHI	0.000
◇	1.001	WNGIN	0.000		
□	1.104				
	1.205				

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

C-3

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

BASE AXIAL FORCE COEFFICIENT, CAB

ANGLE OF ATTACK, ALPHA, DEGREES

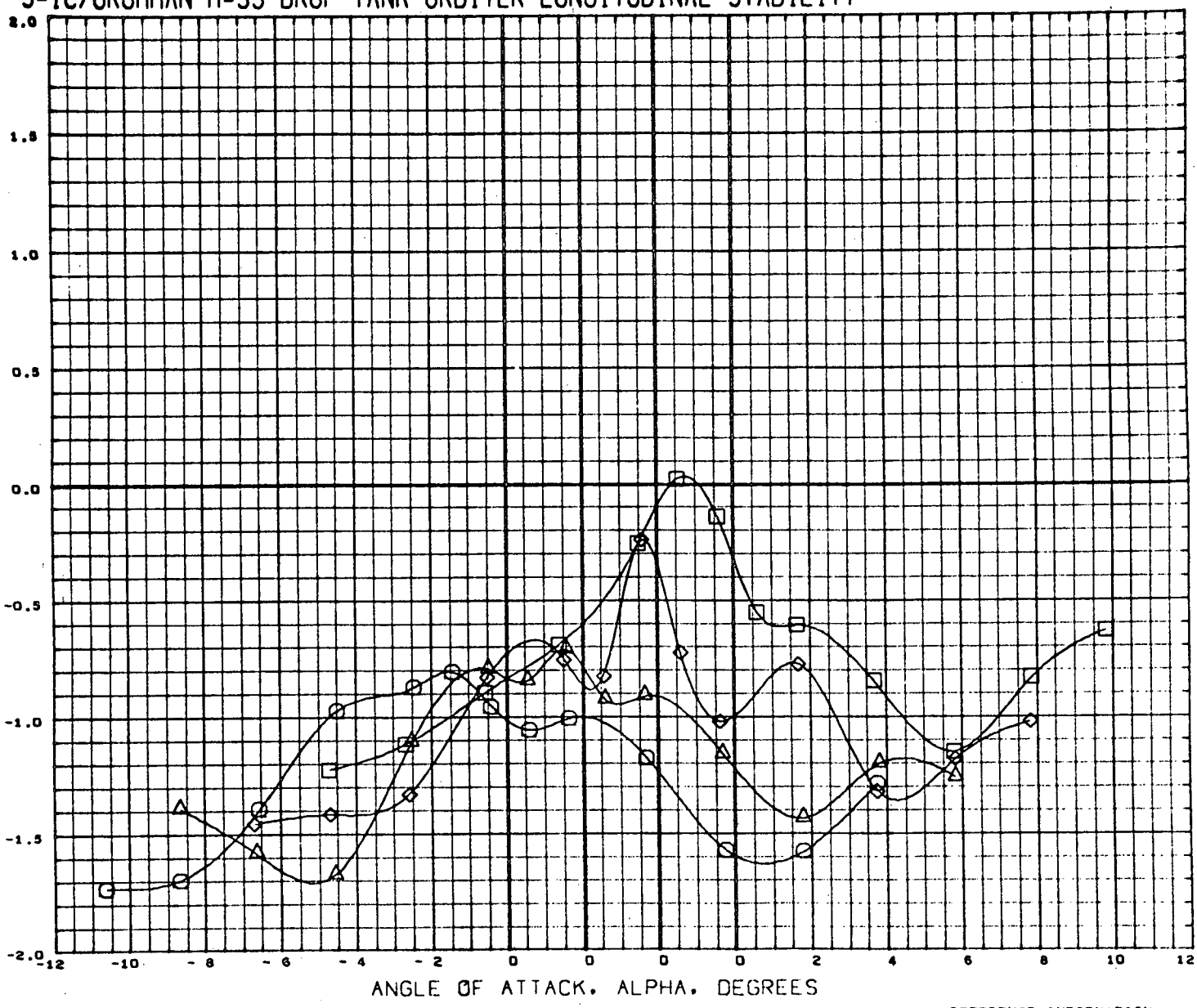
SYMBOL	MACH		PARAMETRIC VALUES		
◇	1.959	BETA	0.000	PHI	0.000
△	3.480	WNGIN	0.000		
○	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



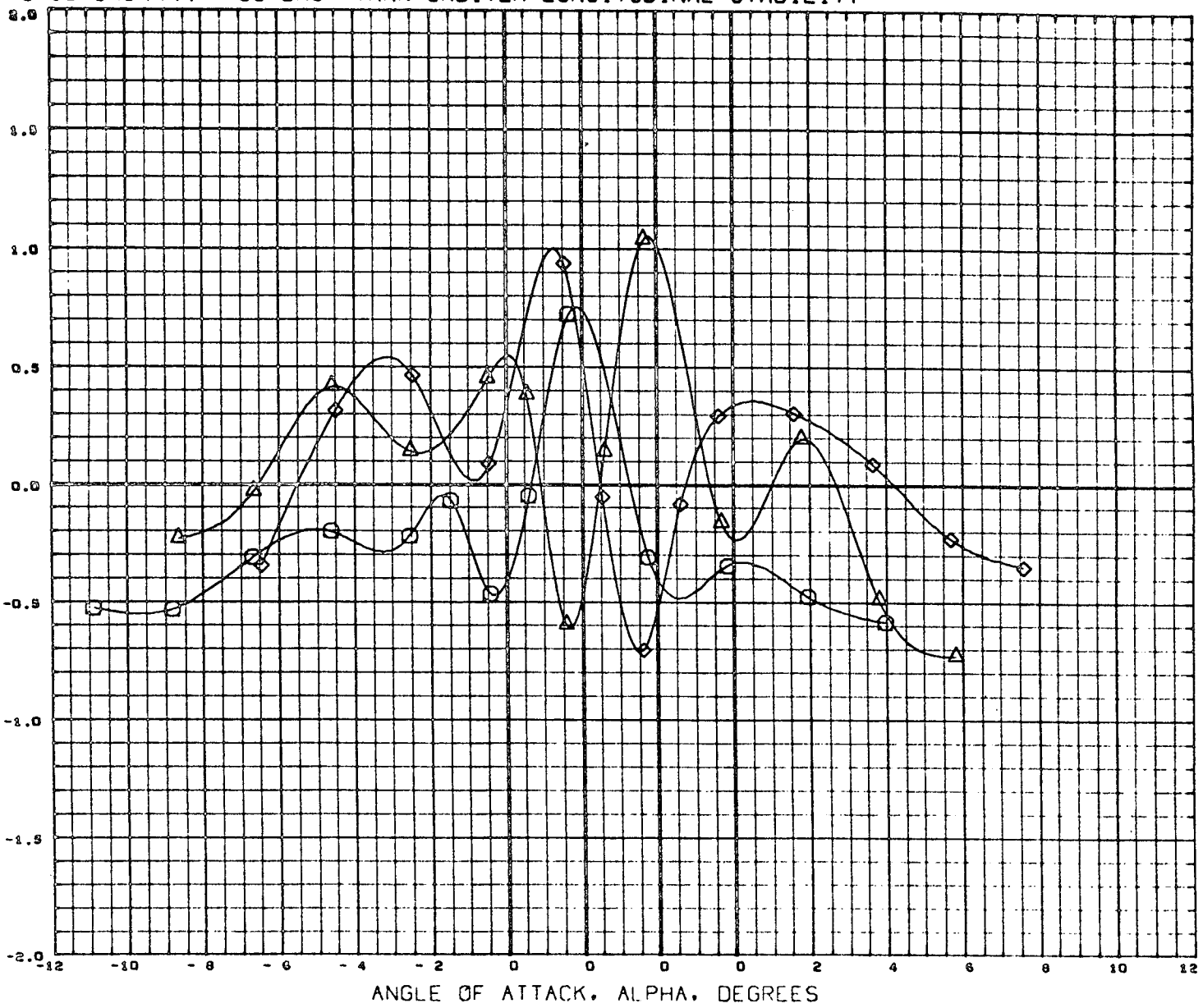
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.900	BETA	0.000	PHI	0.000
△	1.001	WNGIN	0.000		
◇	1.104				
□	1.205				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-IC/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES		
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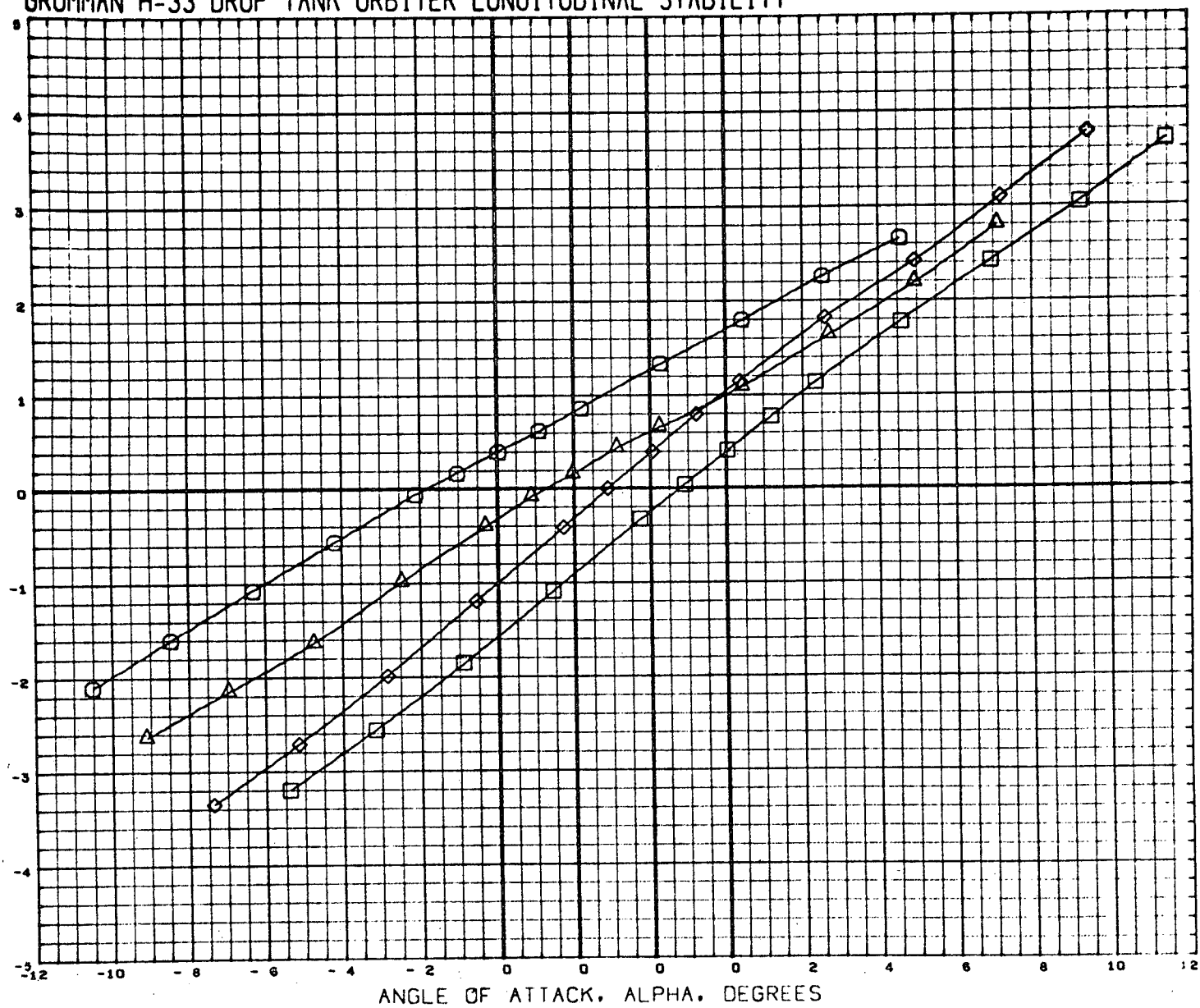
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES	
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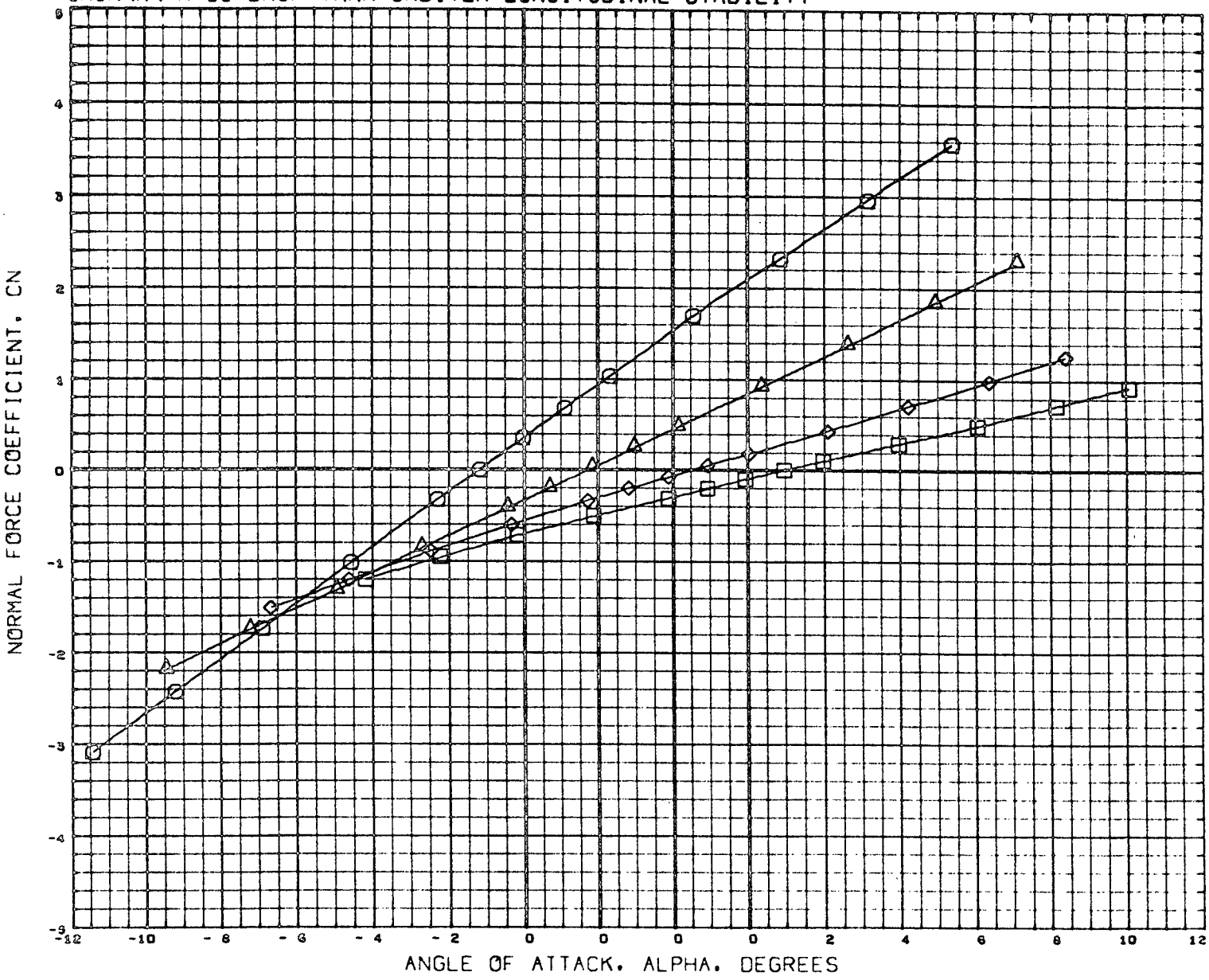
△	0.897		
◇	0.999		
□	1.099		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES
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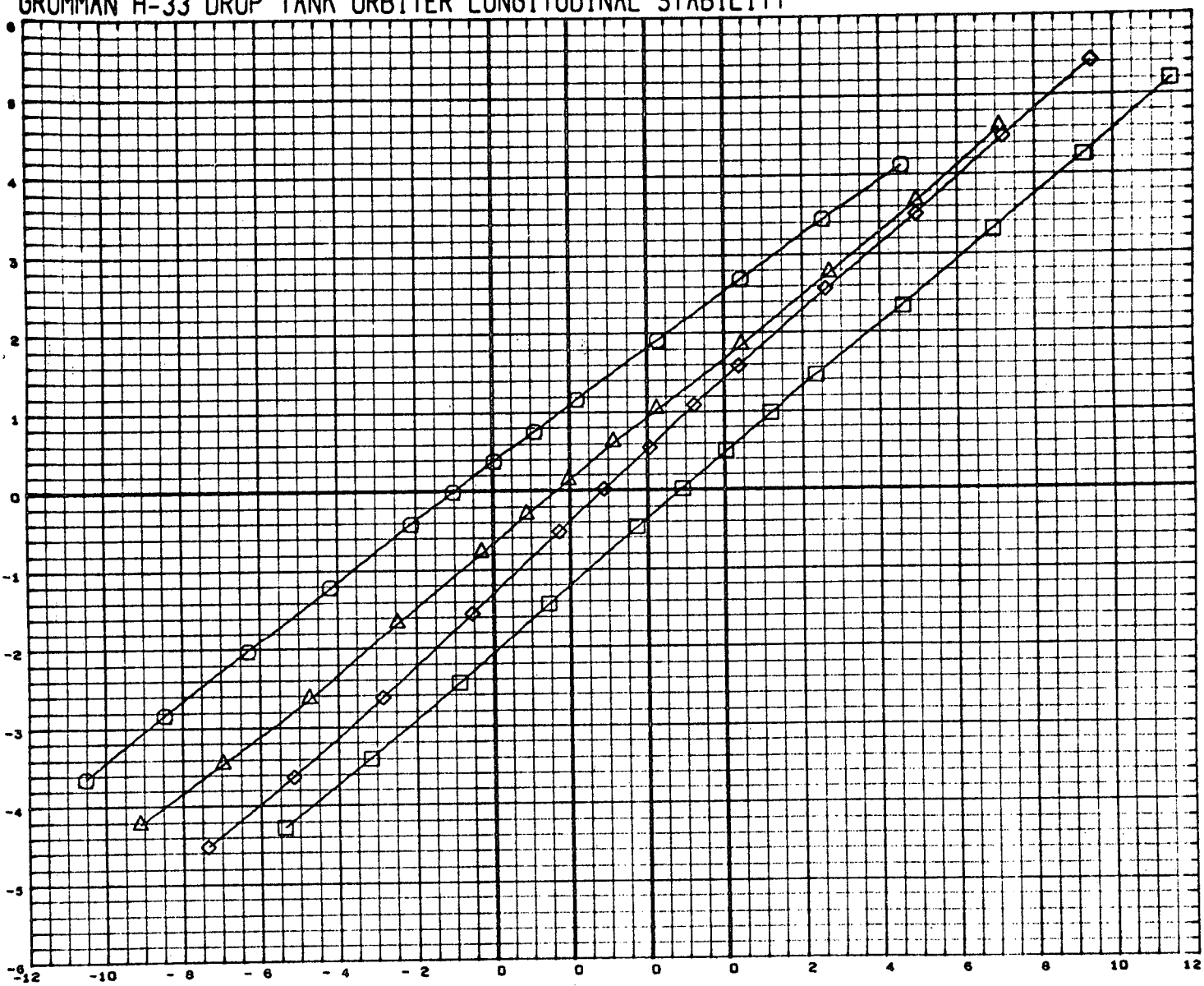
△	1.971		
◇	3.480		
□	4.959		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



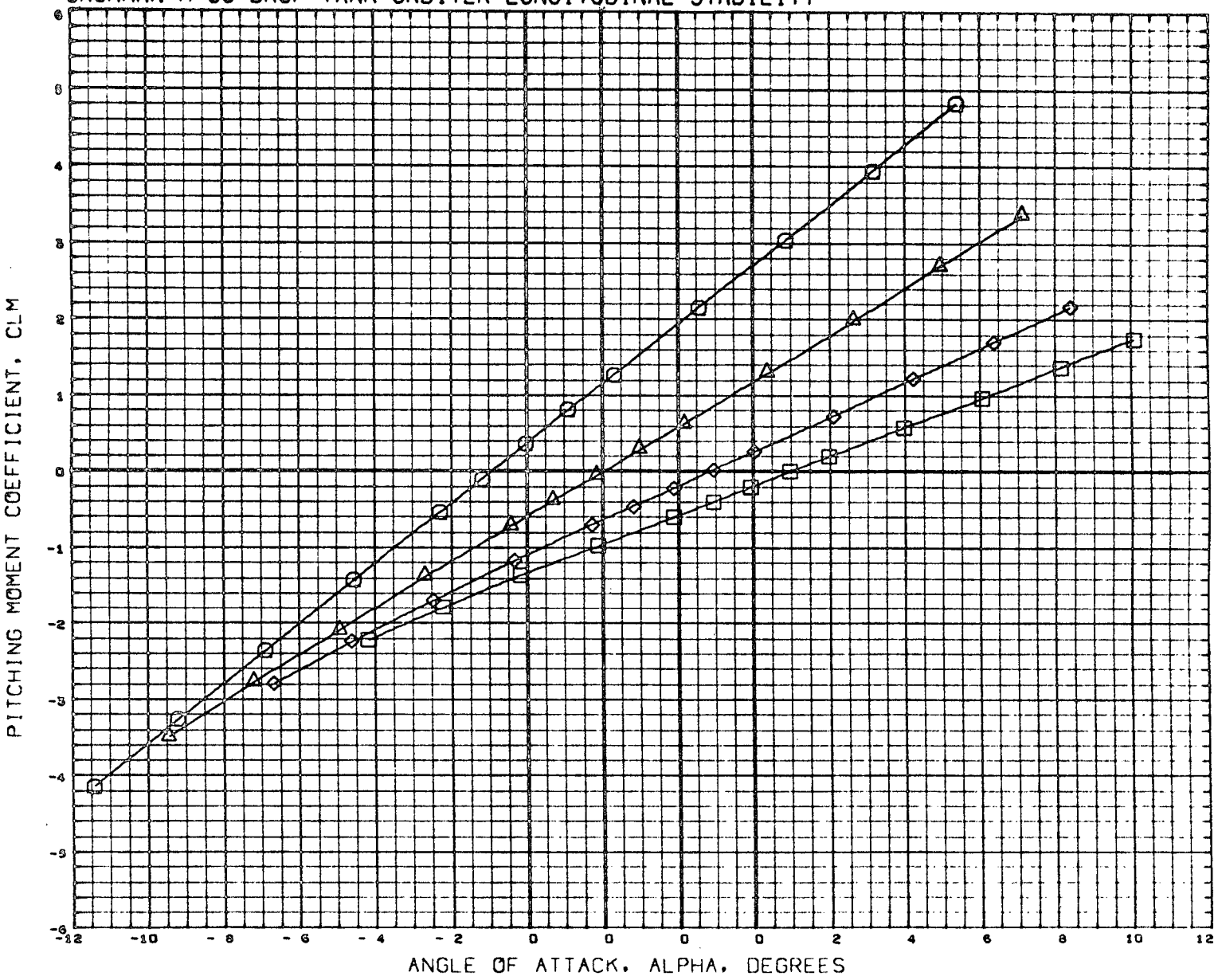
SYMBOL	MACH	PARAMETRIC VALUES	
○	0.597	BETA	0.000
△	0.897		
◇	0.999		
□	1.099		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



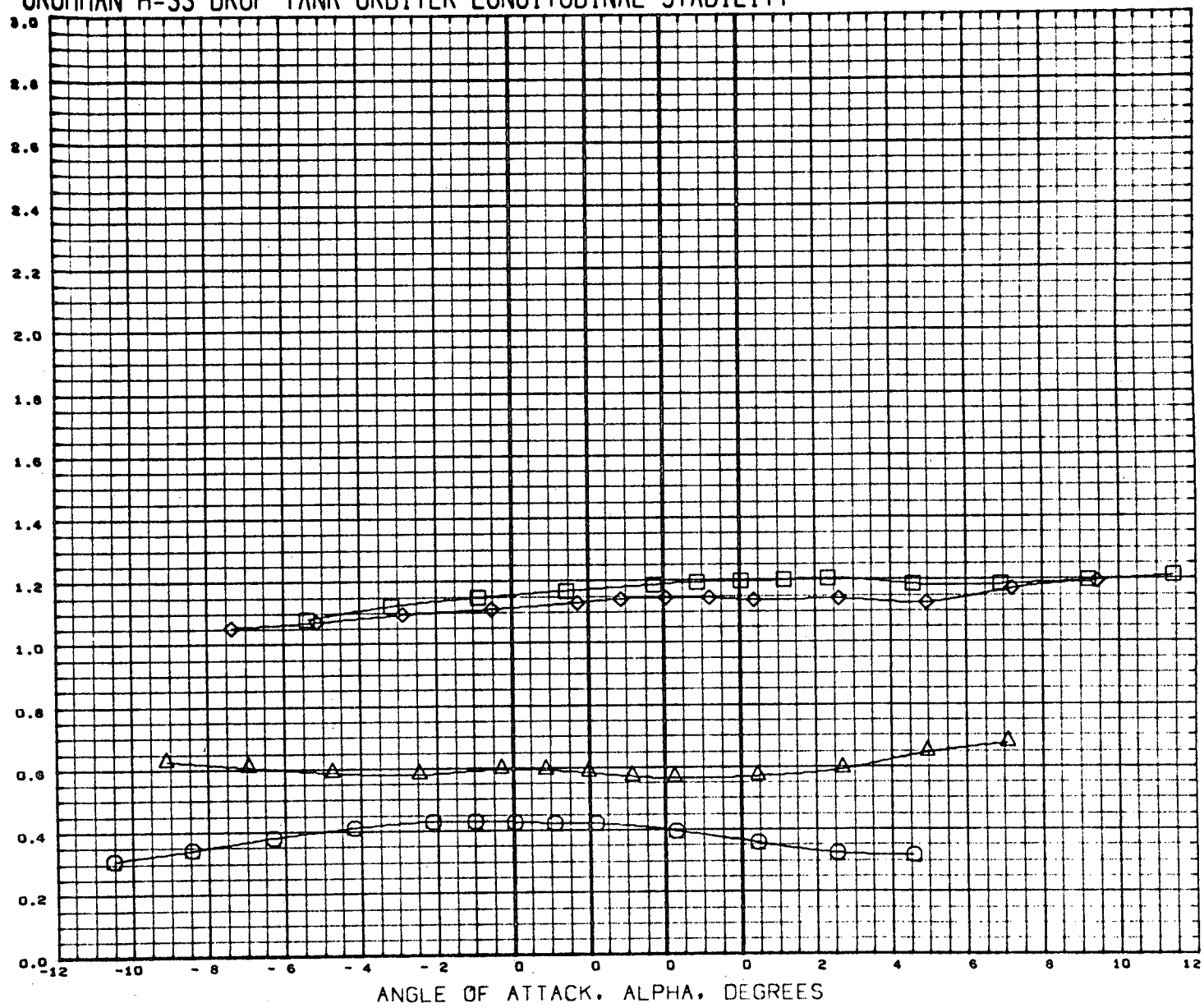
SYMBOL	MACH	PARAMETRIC VALUES	
○	1.195	BETA	0.000
△	1.971		
◇	3.480		
□	4.959		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



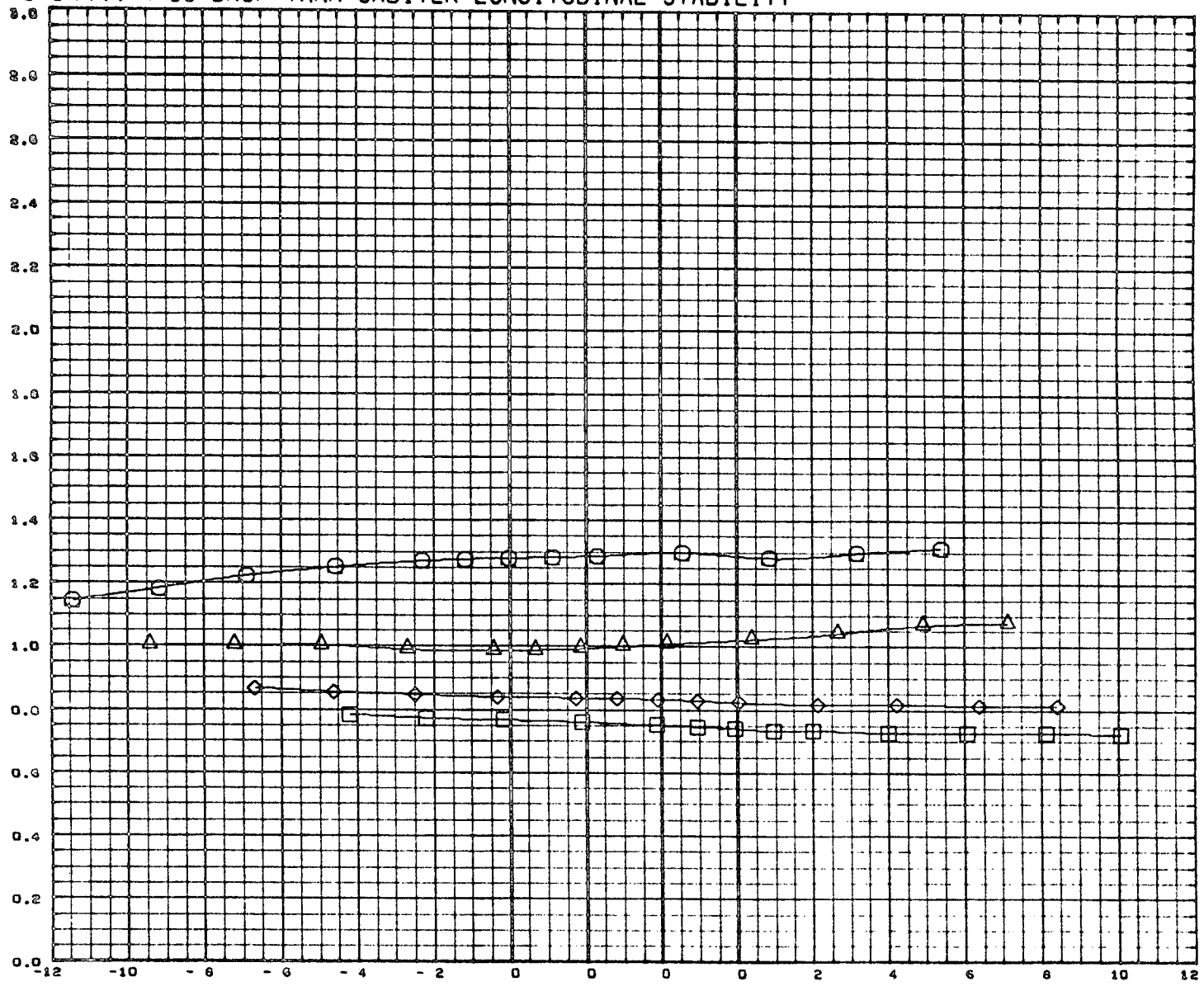
SYMBOL	MACH	PARAMETRIC VALUES	
○	0.597	BETA	0.000
△	0.897		
◇	0.999		
□	1.099		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



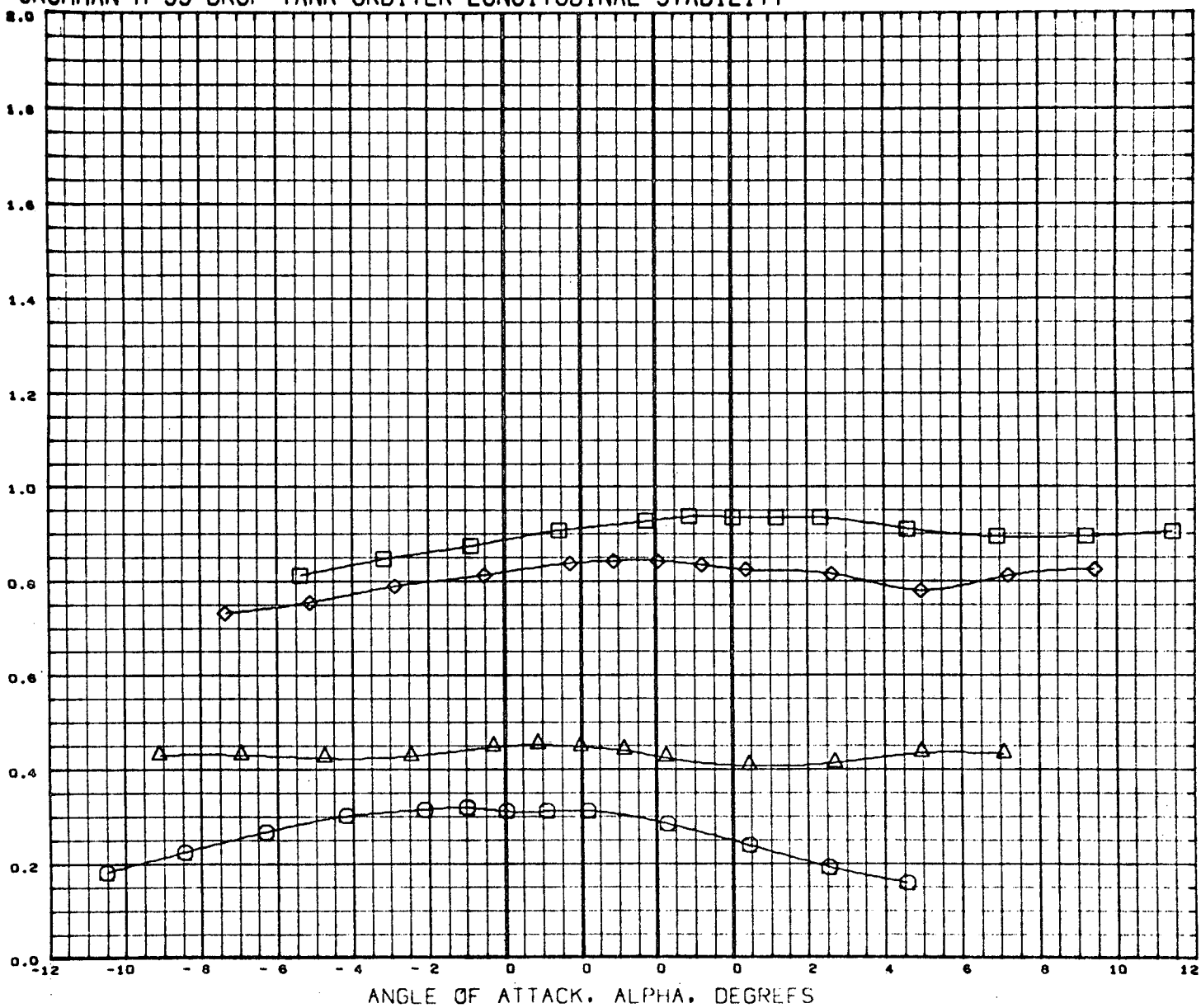
MBOL	MACH	PARAMETRIC VALUES	
○	1.195	BETA	0.000
△	1.971		
◇	3.480		
□	4.959		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES	
○	0.597	BETA	0.000
△	0.897		
◇	0.999		
□	1.099		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	3.5070	IN.
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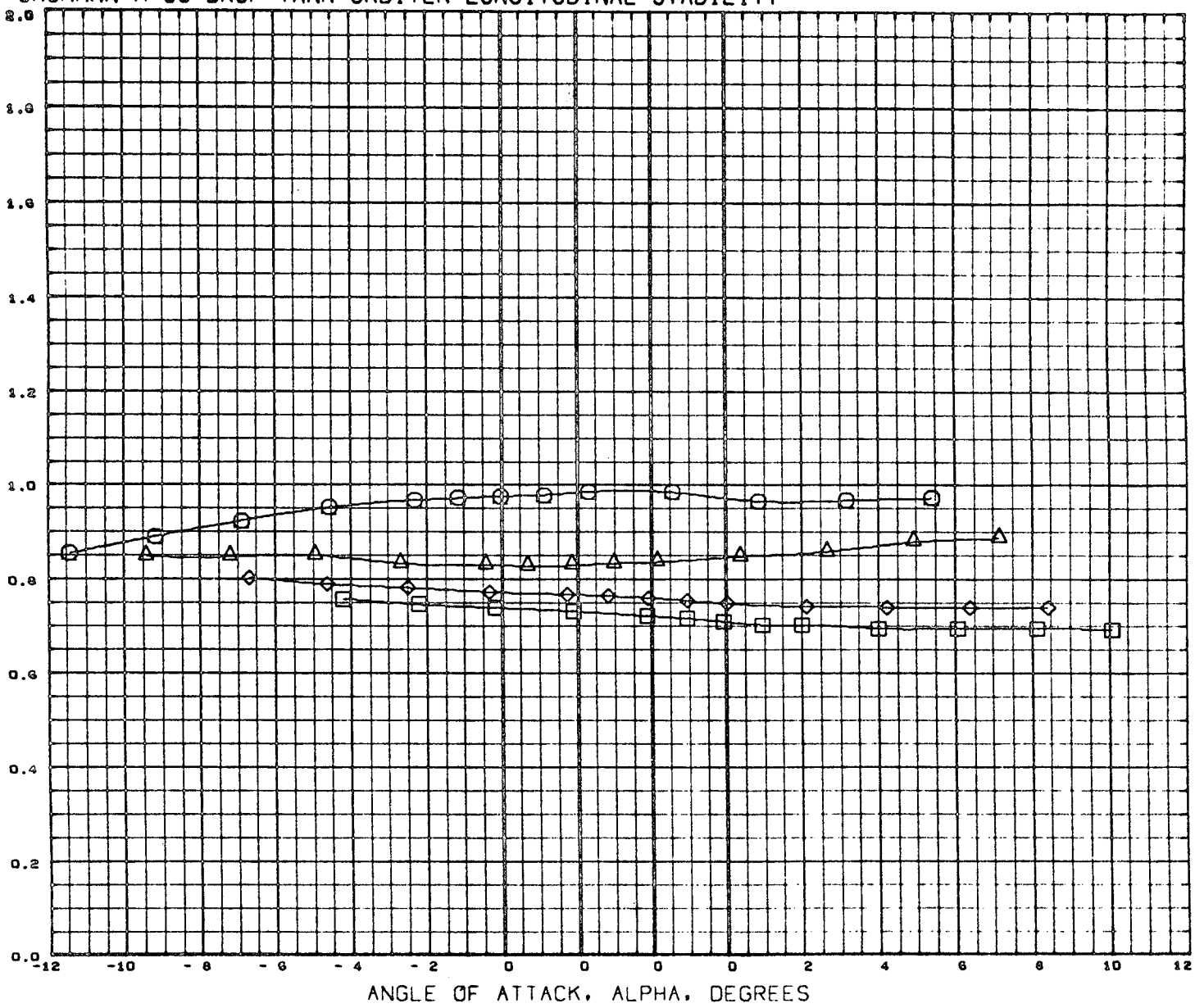
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



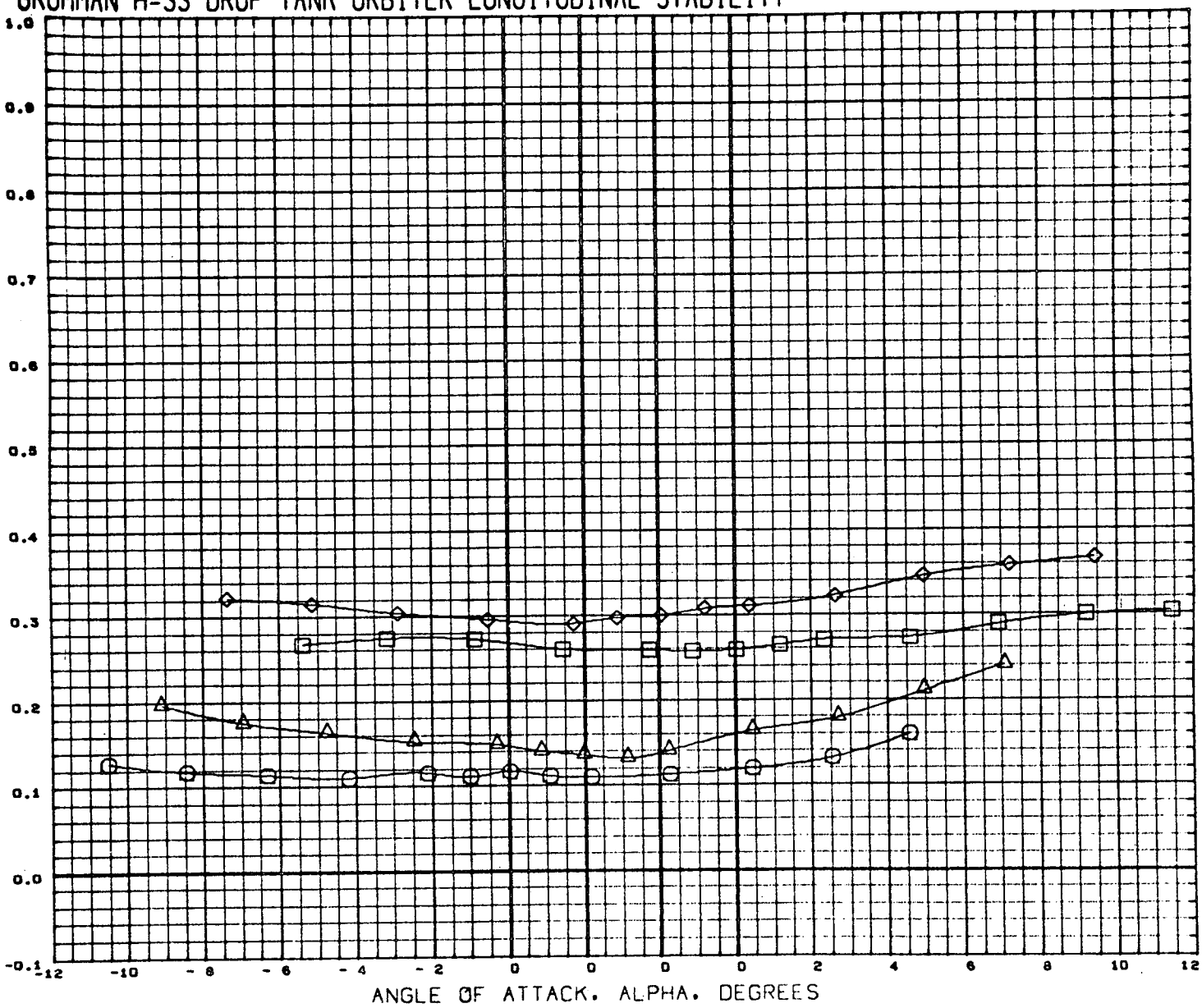
SYMBOL	MACH	PARAMETRIC VALUES	
○	1.195	BETA	0.000
△	1.971		
◇	3.480		
□	4.959		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



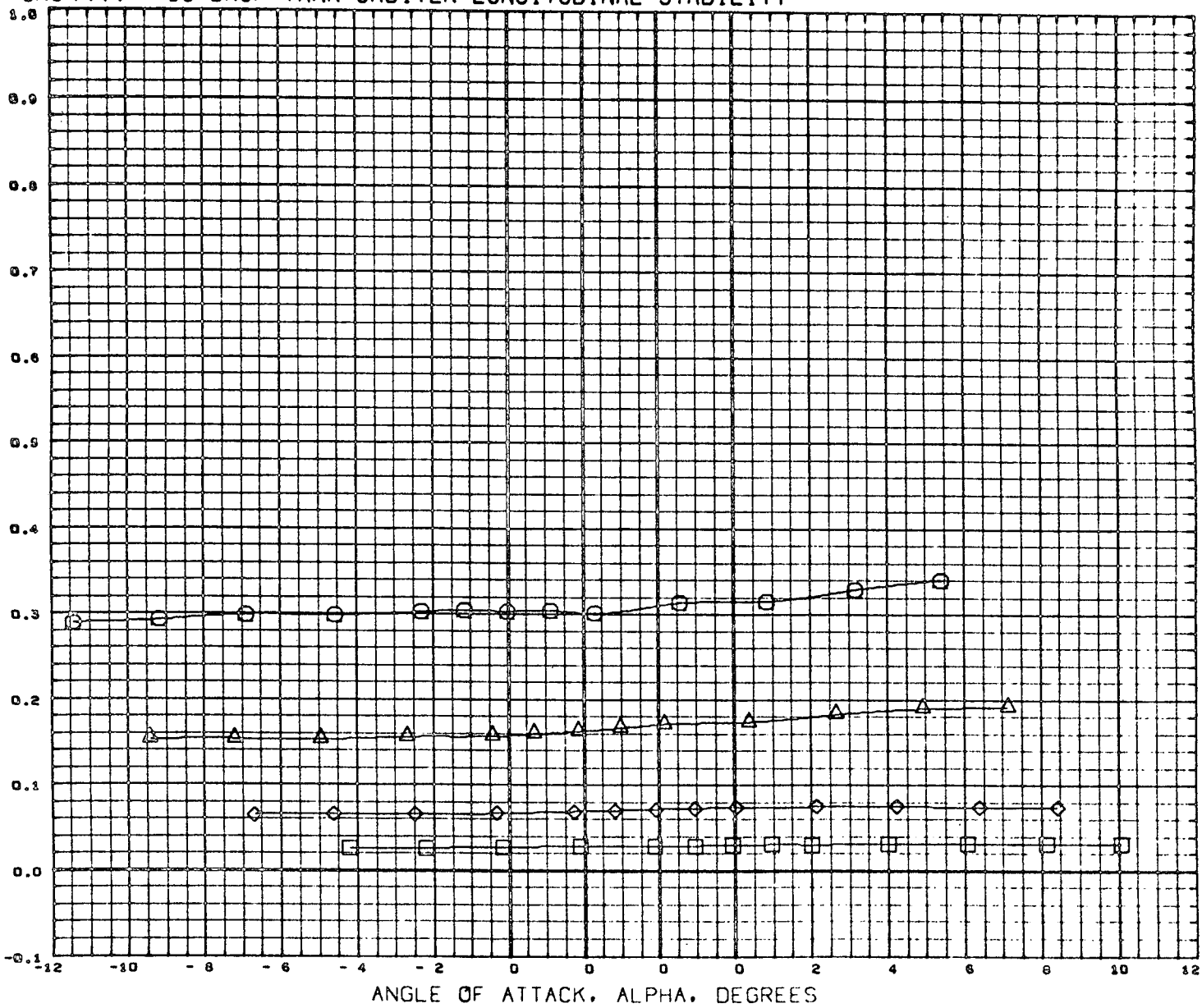
SYMBOL	MACH	PARAMETRIC VALUES	
○	0.597	BETA	0.000
△	0.897		
◇	0.999		
□	1.099		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



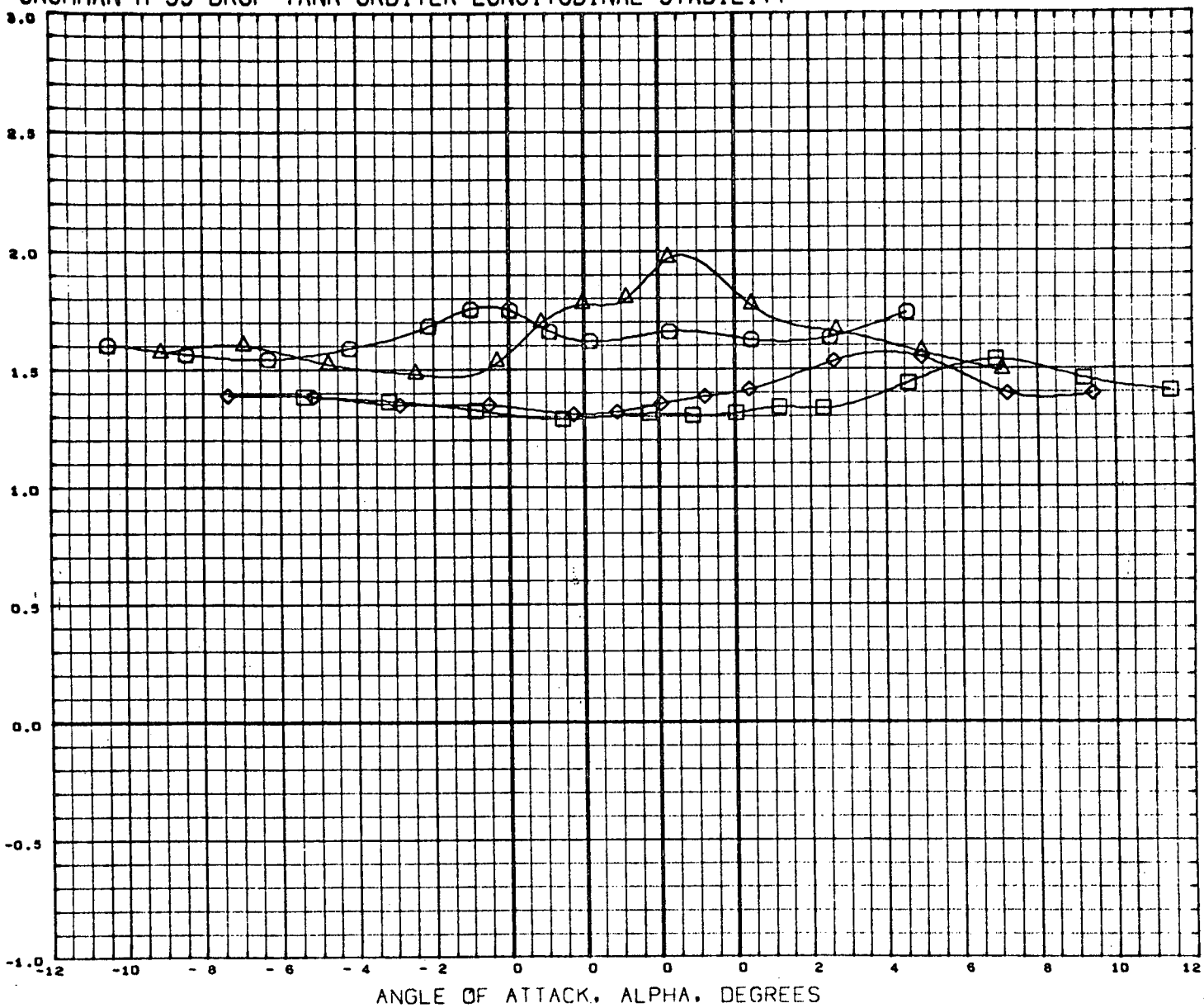
SYMBOL	MACH	PARAMETRIC VALUES	
○	1.195	BETA	0.000
△	1.971		
◇	3.480		
□	4.959		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



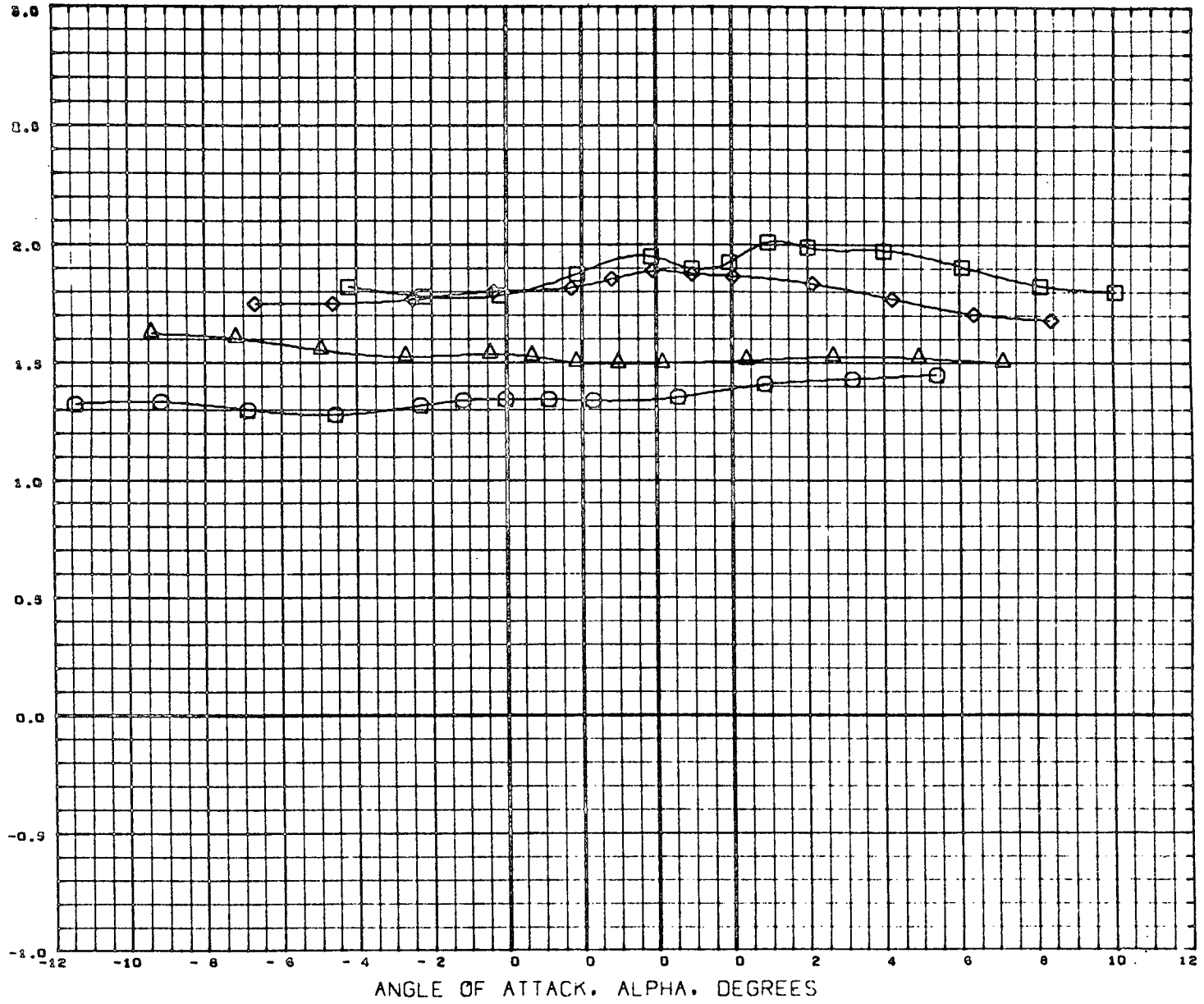
SYMBOL	MACH	PARAMETRIC VALUES	
○	0.597	BETA	0.000
△	0.897		
◇	0.999		
□	1.099		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



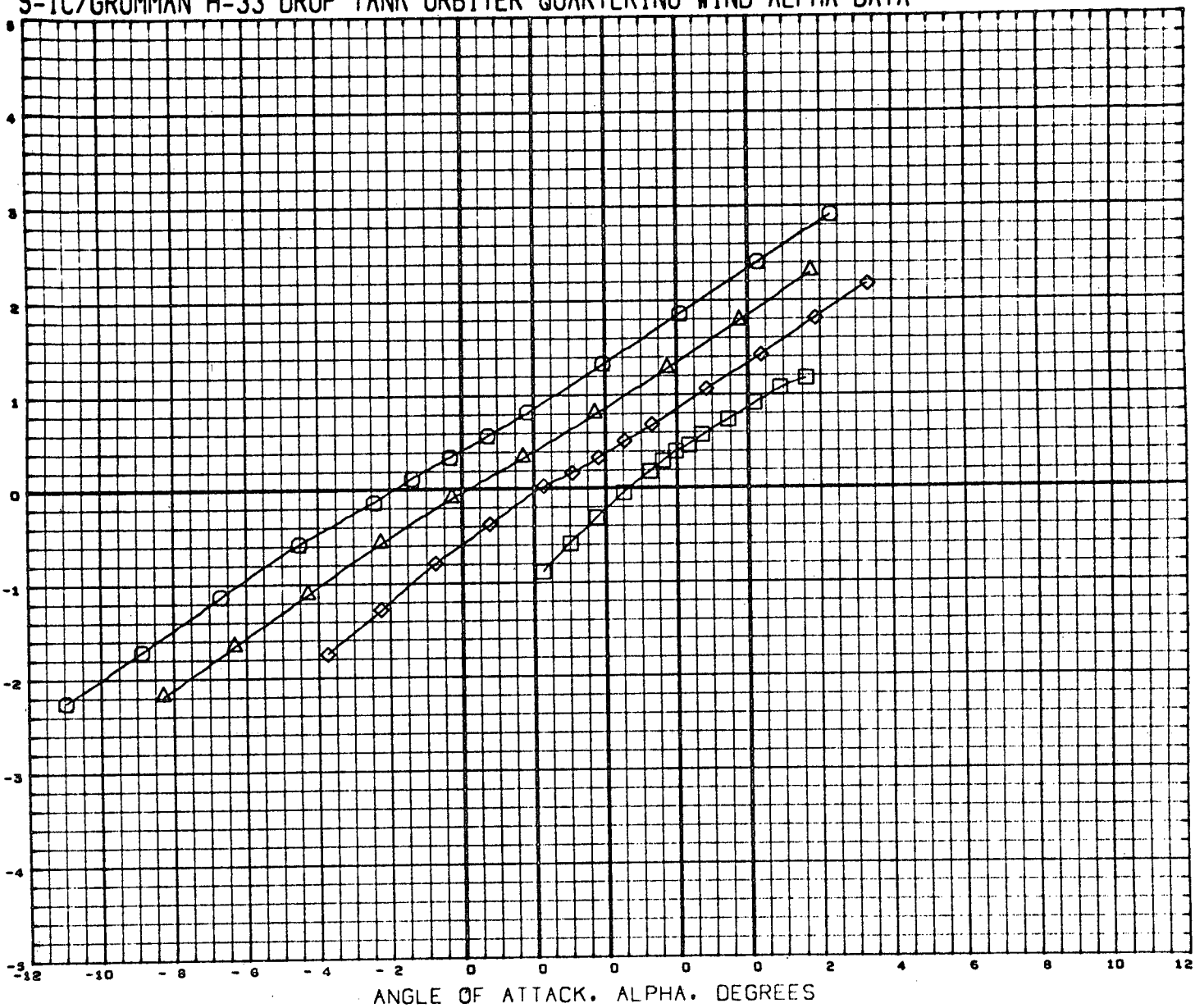
SYMBOL	MACH		PARAMETRIC VALUES
○	1.195	BETA	0.000
△	1.971		
◇	3.480		
□	4.959		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.3070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	0.599
WNGINC	0.000

DATA SOURCE

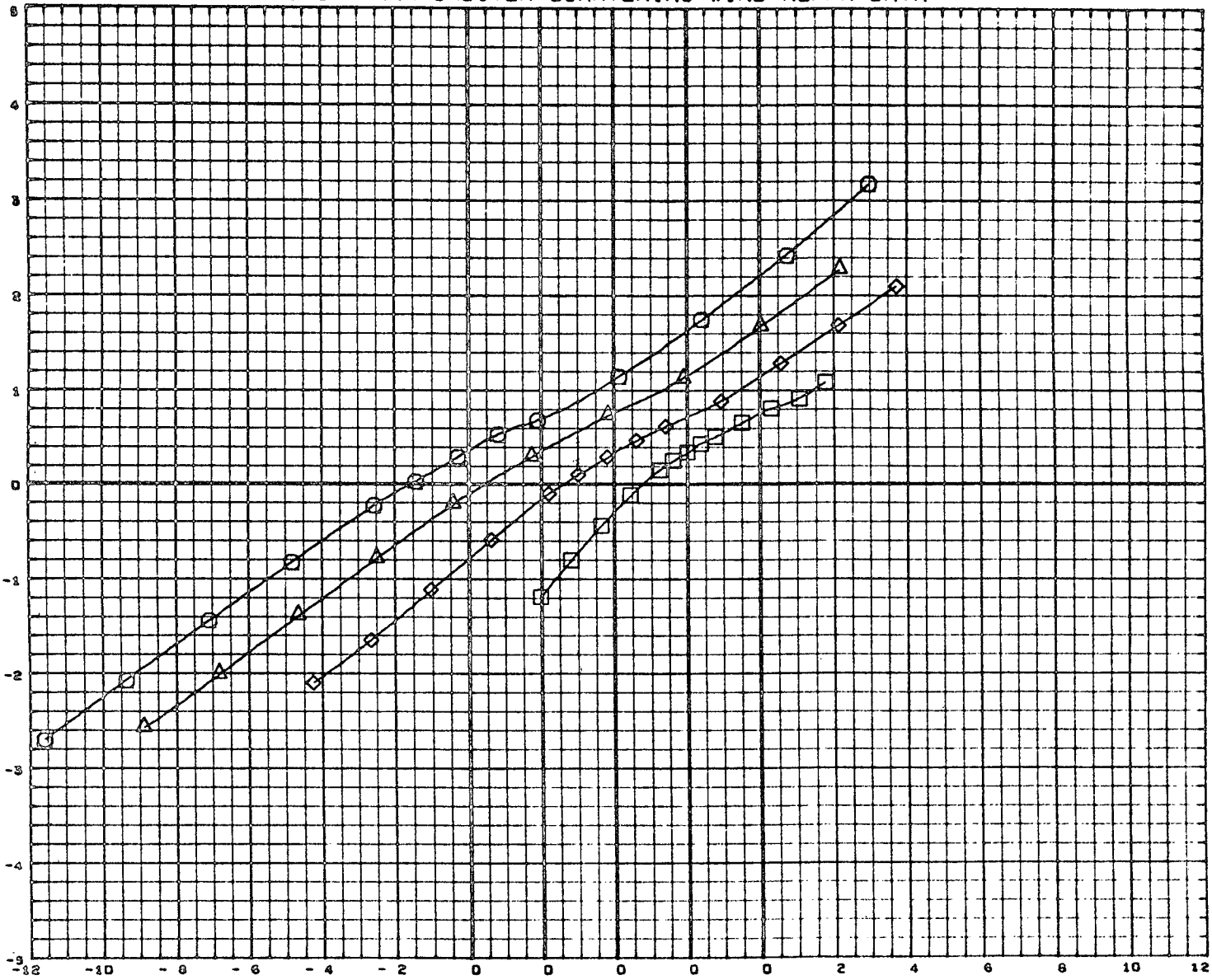
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	0.904
WNGINC	0.000

DATA SOURCE

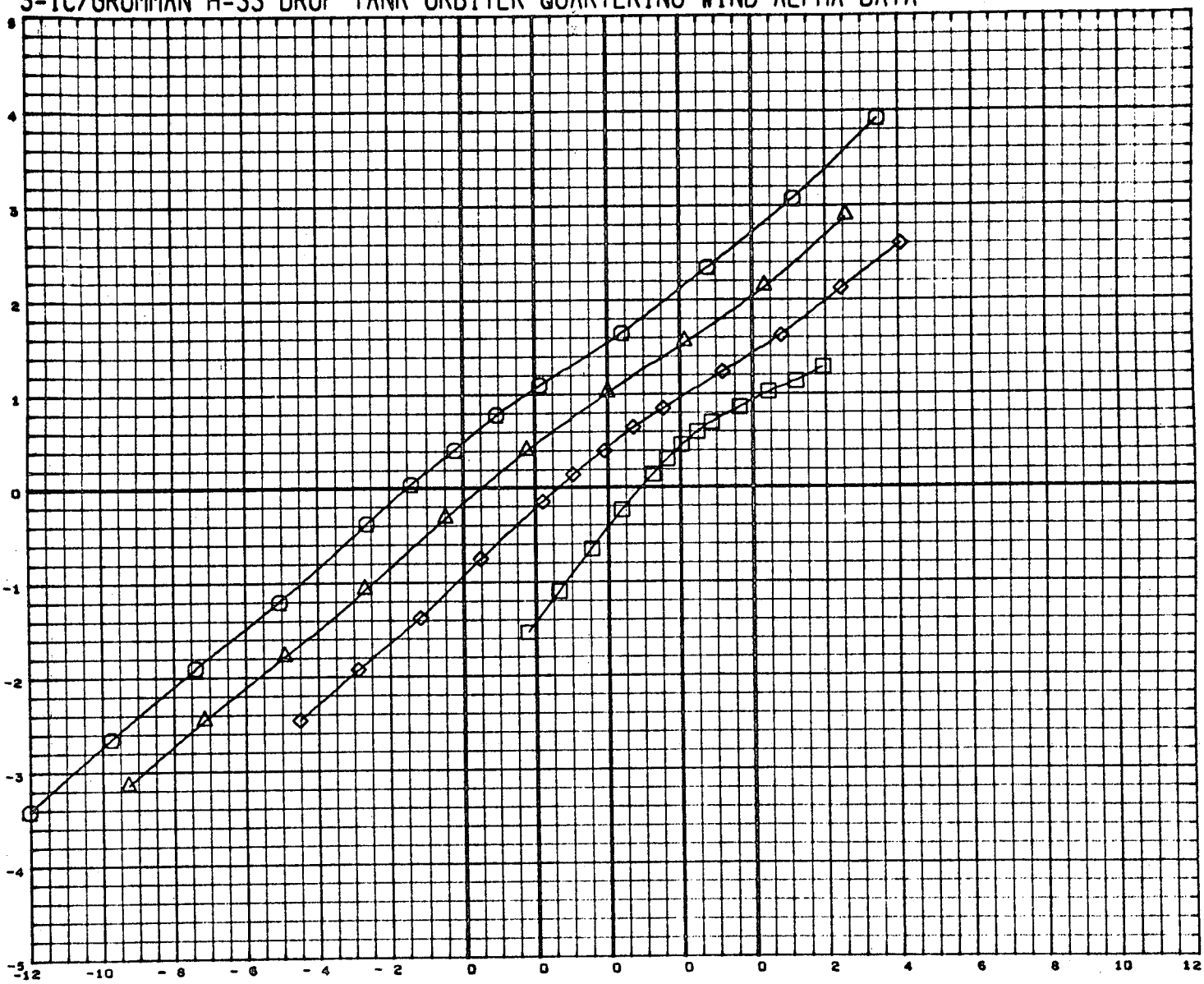
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	0.999
WNGINC	0.000

DATA SOURCE

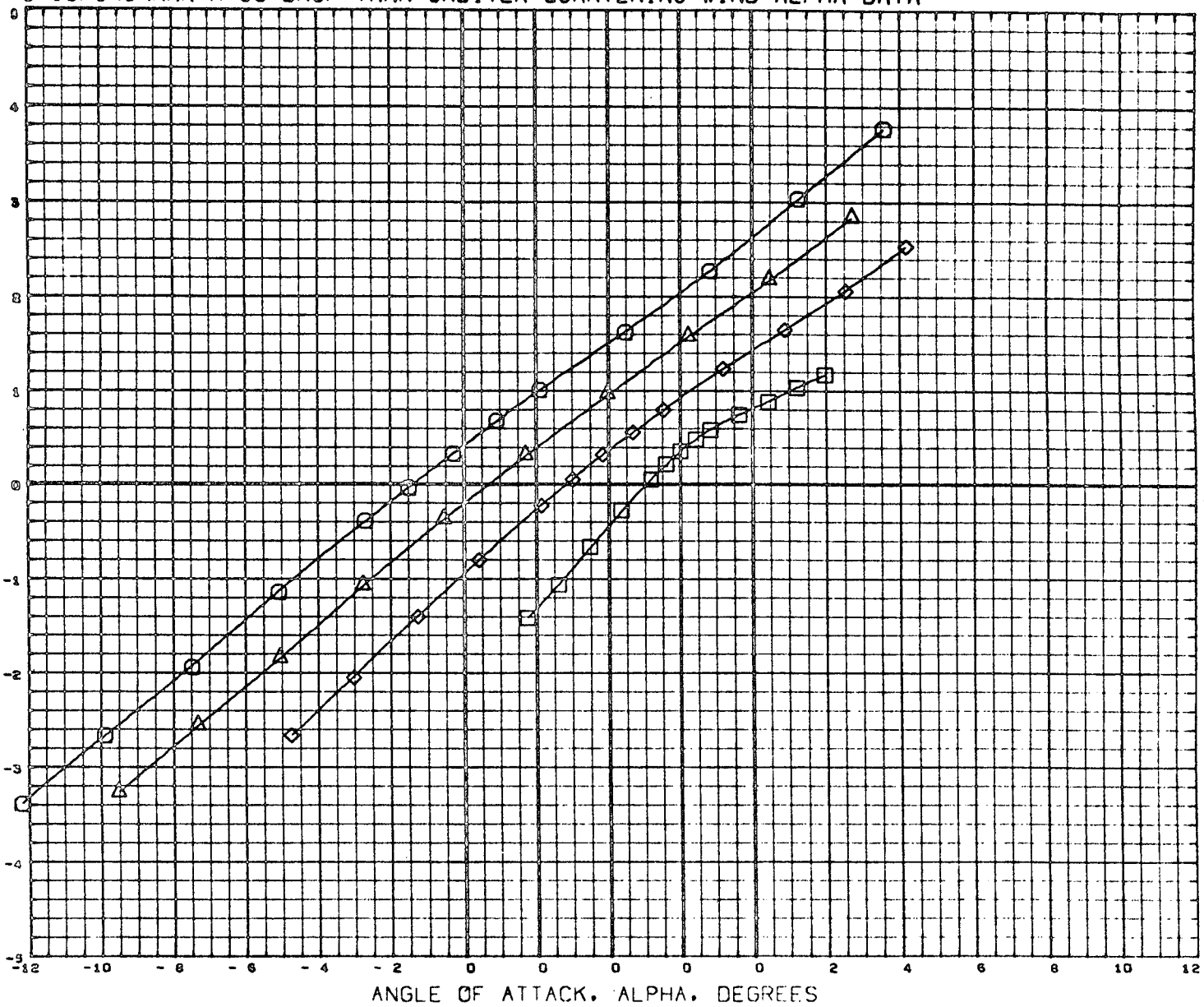
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	1.202
WNGINC	0.000

DATA SOURCE

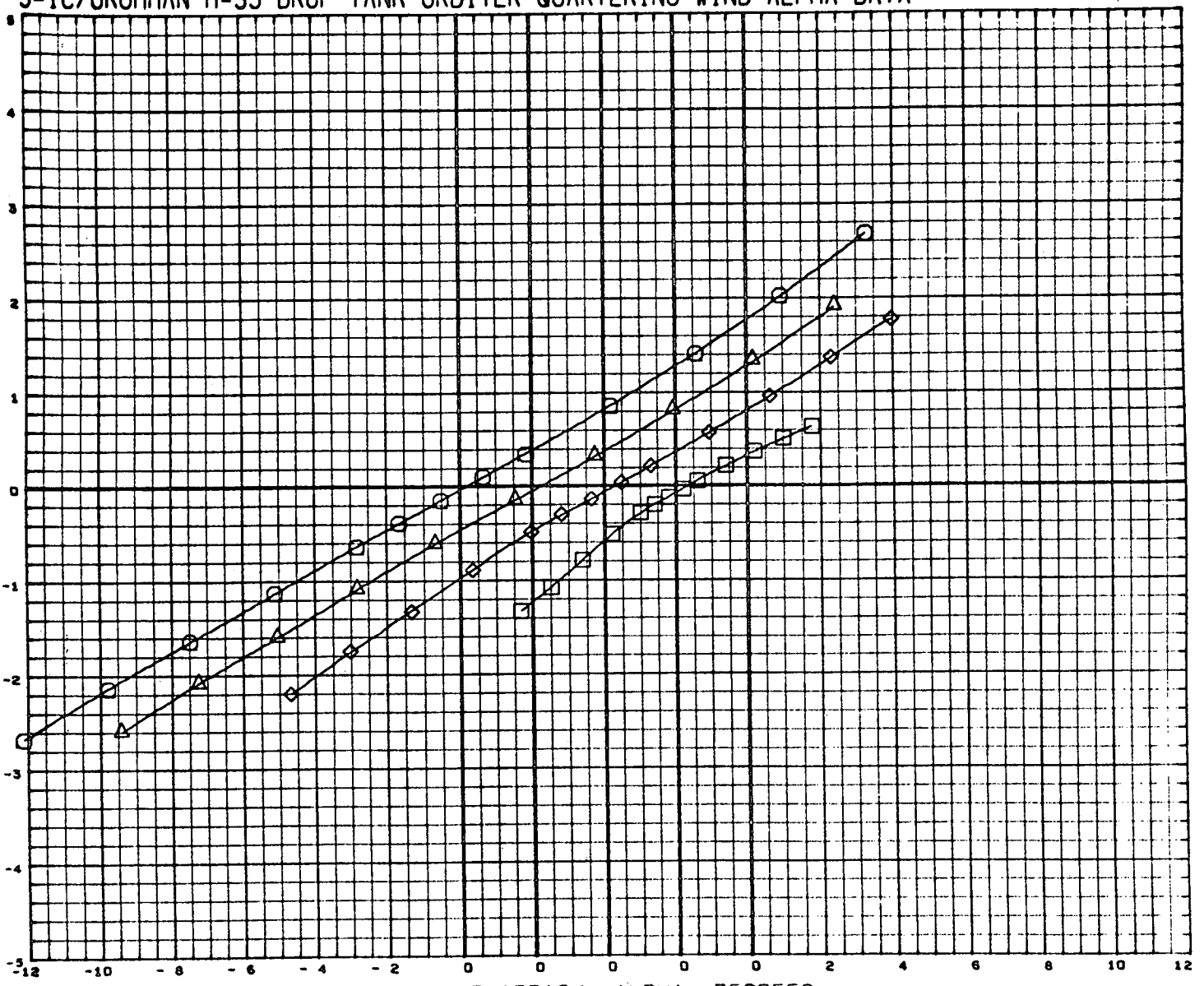
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	1.965
WNGINC	0.000

DATA SOURCE

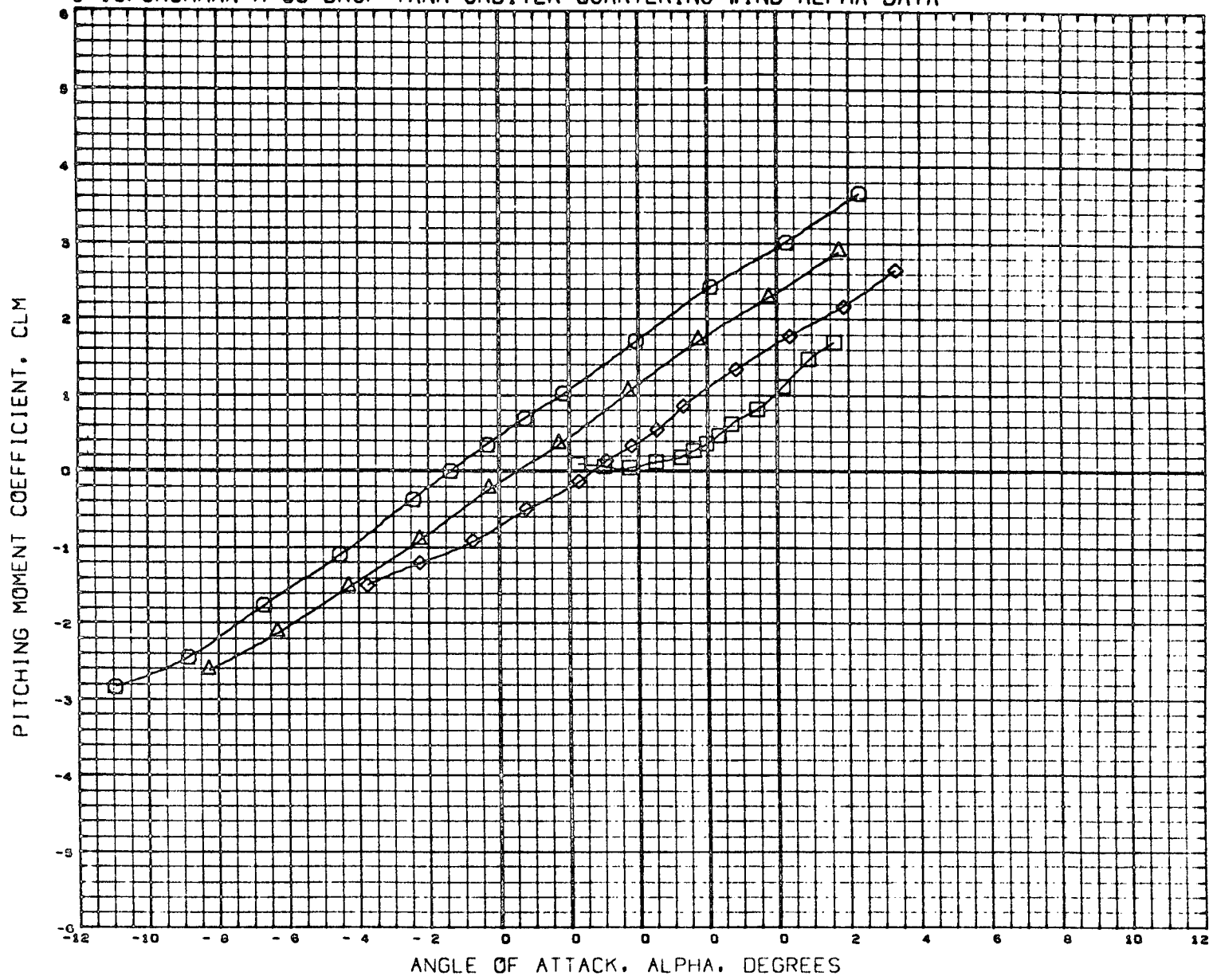
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC4A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	0.599
WNGINC	0.000

DATA SOURCE

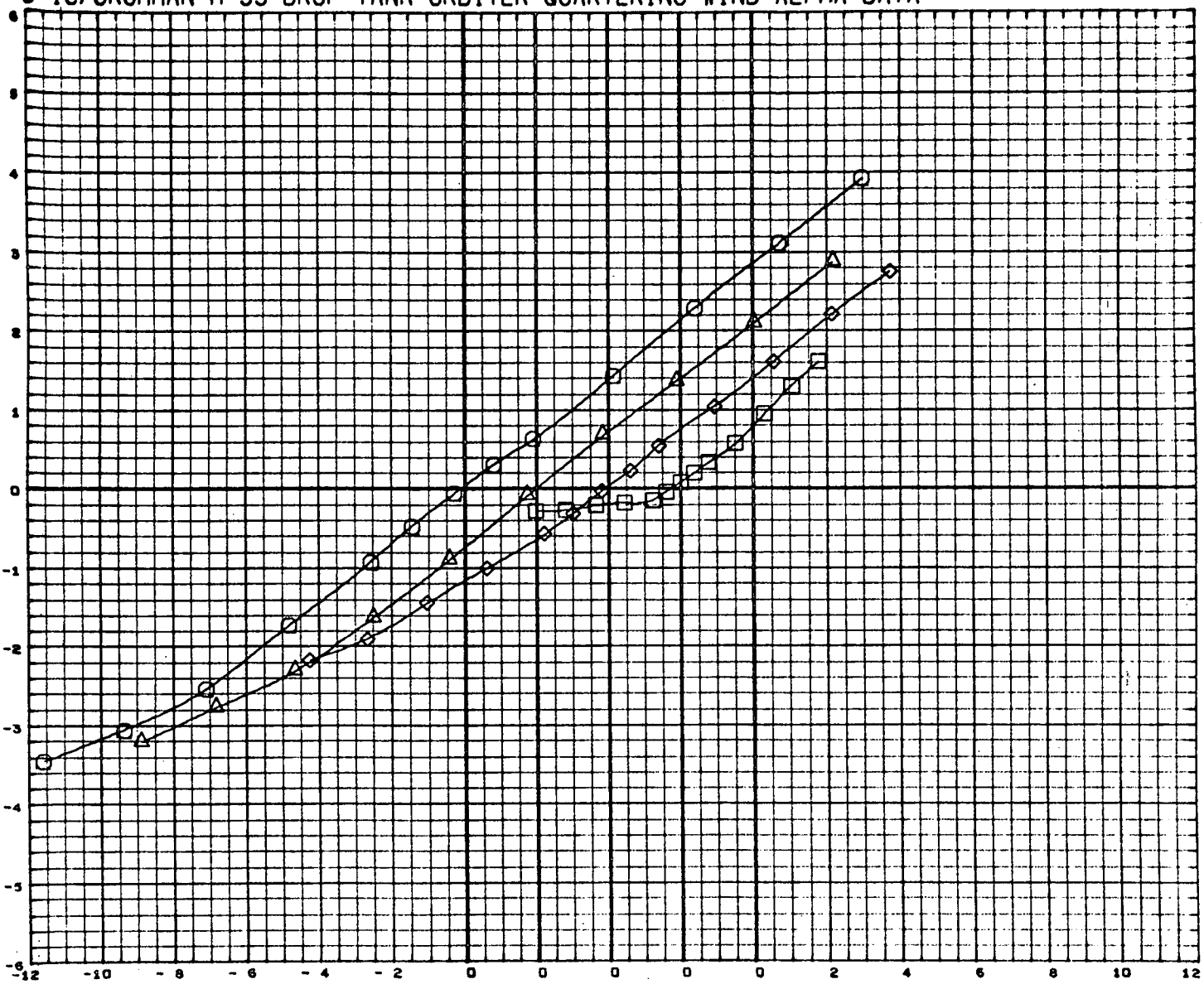
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	PARAMETRIC VALUES	
○	0.000	MACH	0.904
△	20.000	WNGINC	0.000
◇	45.000		
□	70.000		

DATA HIST. CODE CCCGC4A

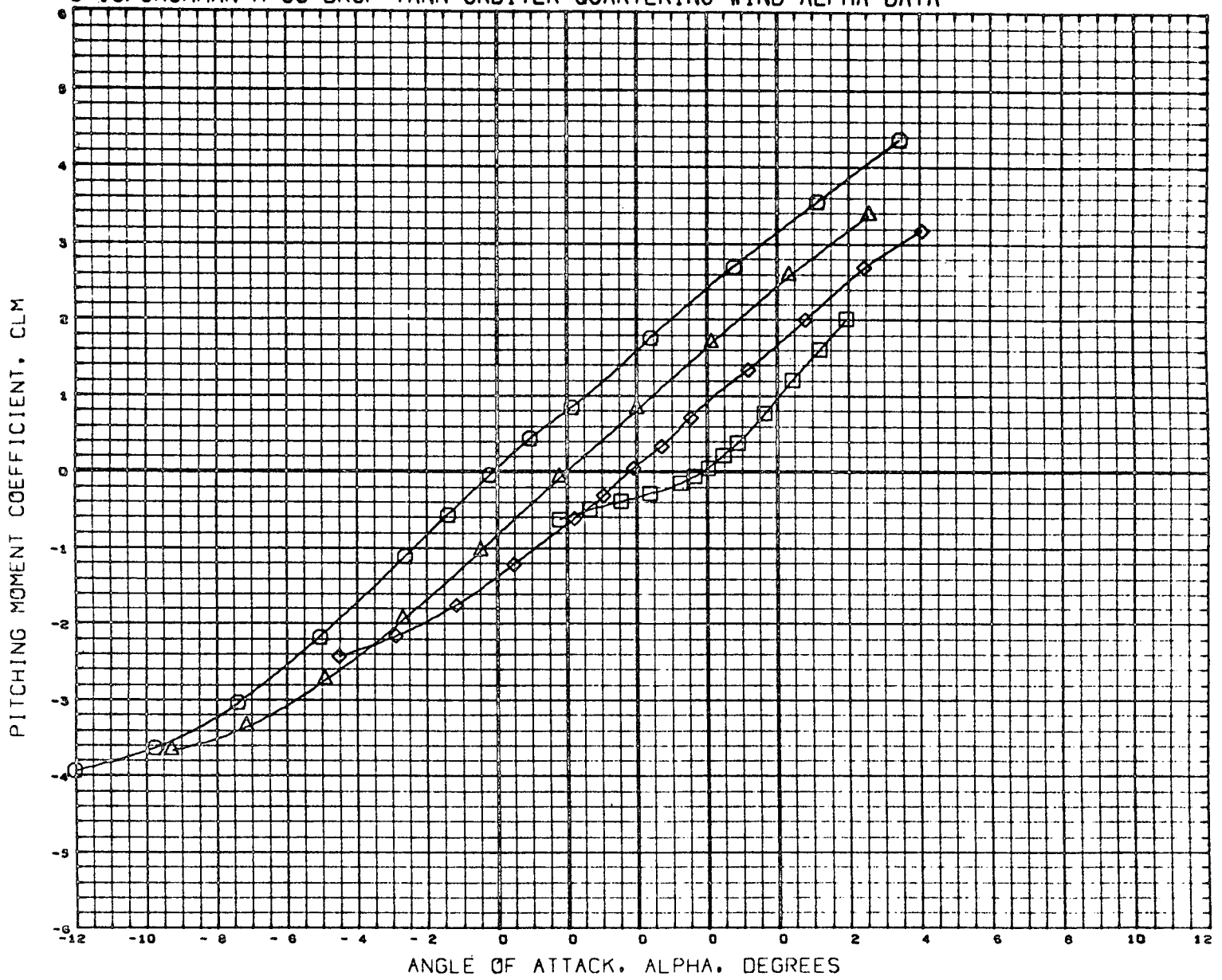
DATA SOURCE

DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	0.999
WNGINC	0.000

DATA SOURCE

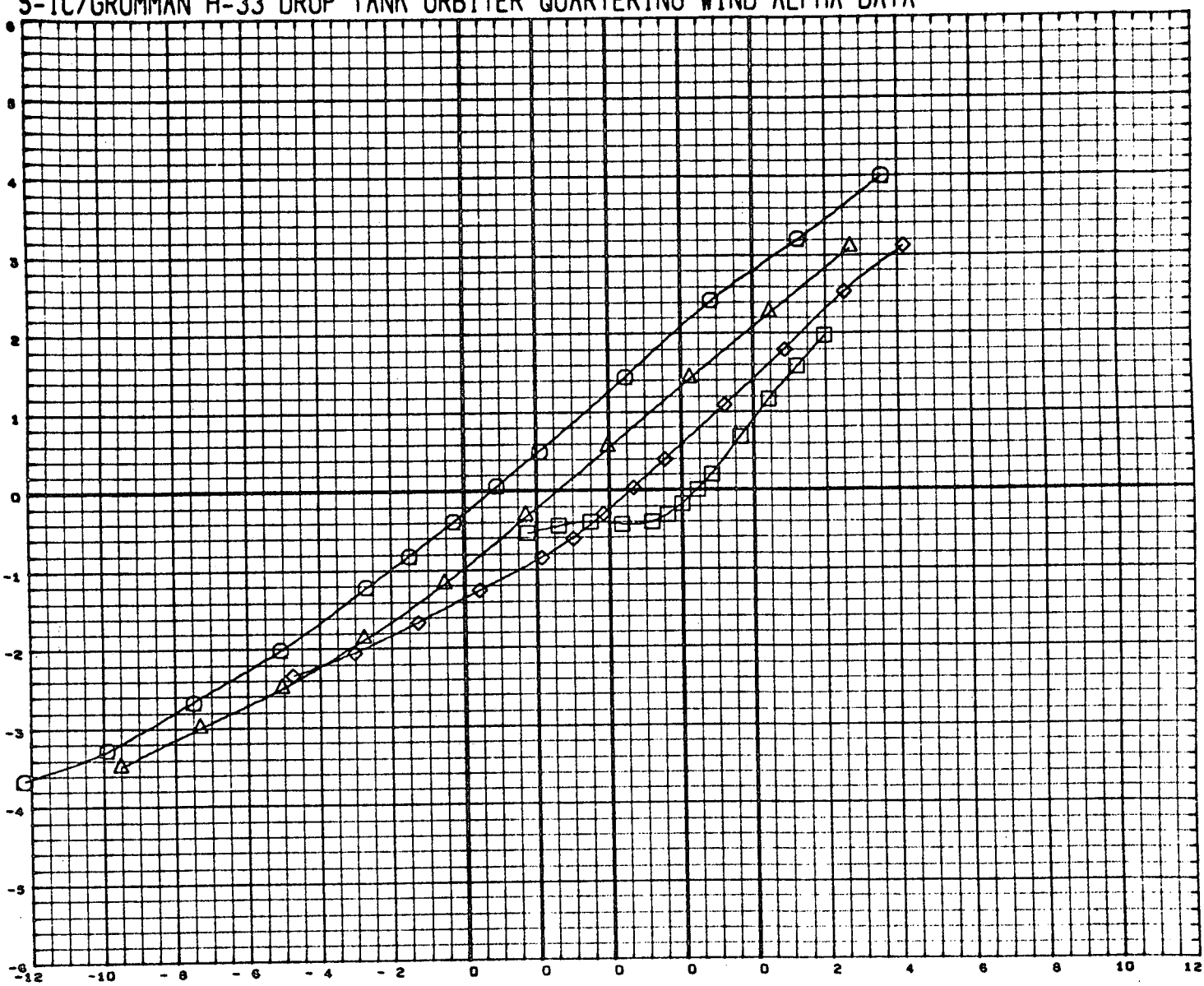
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	1.202
WNGINC	0.000

DATA SOURCE

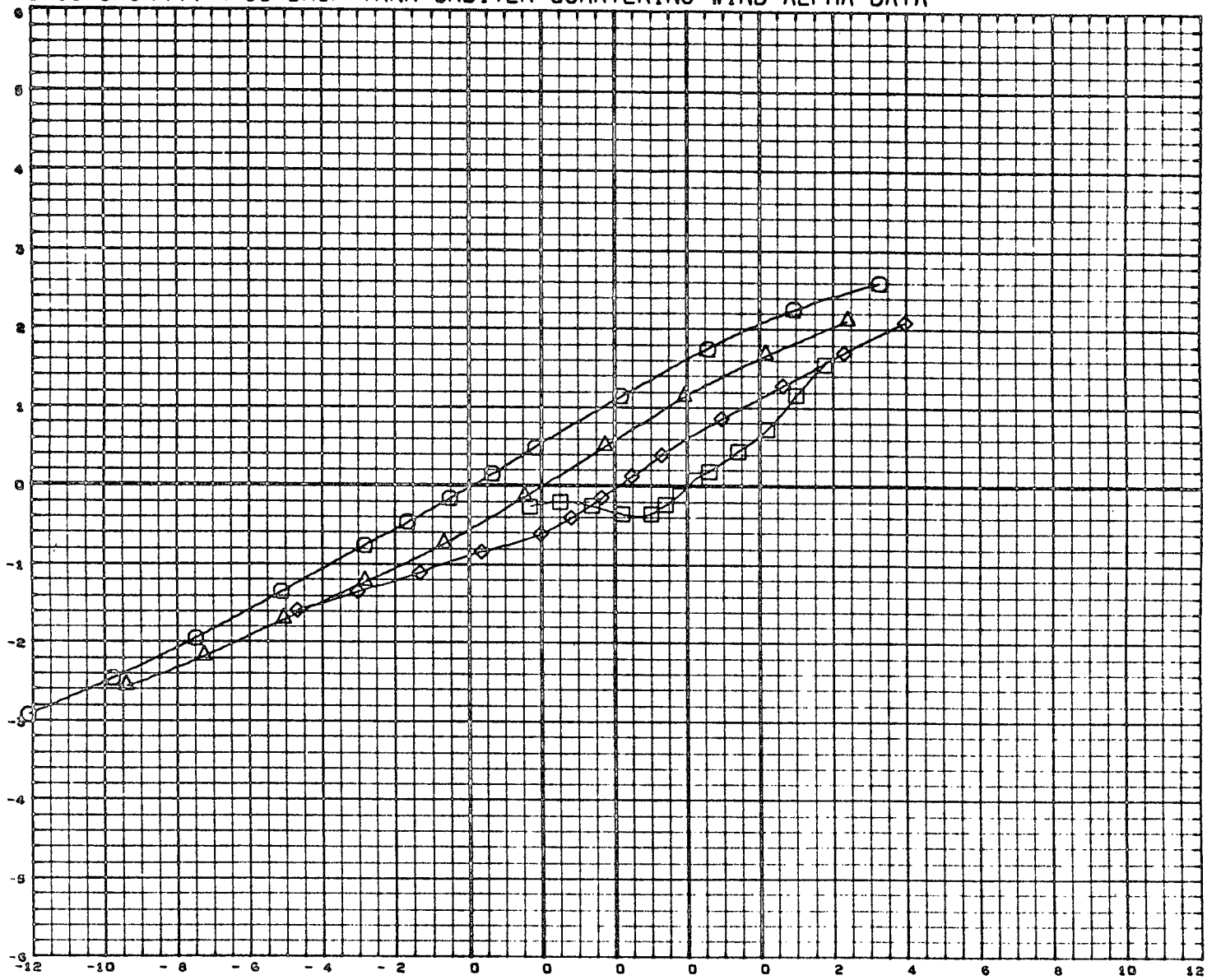
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	1.965
WNGINC	0.000

DATA SOURCE

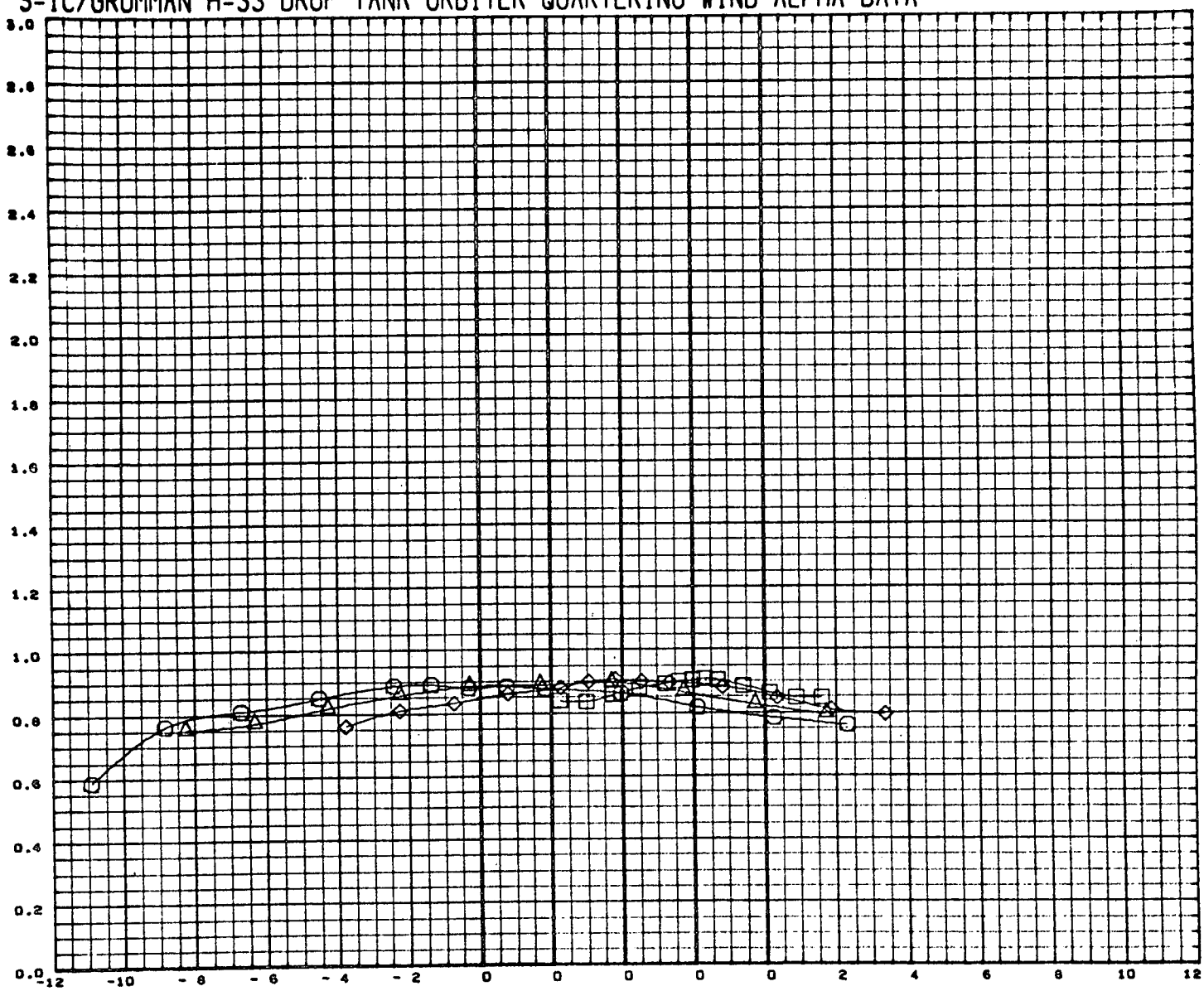
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	0.599
WNGINC	0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

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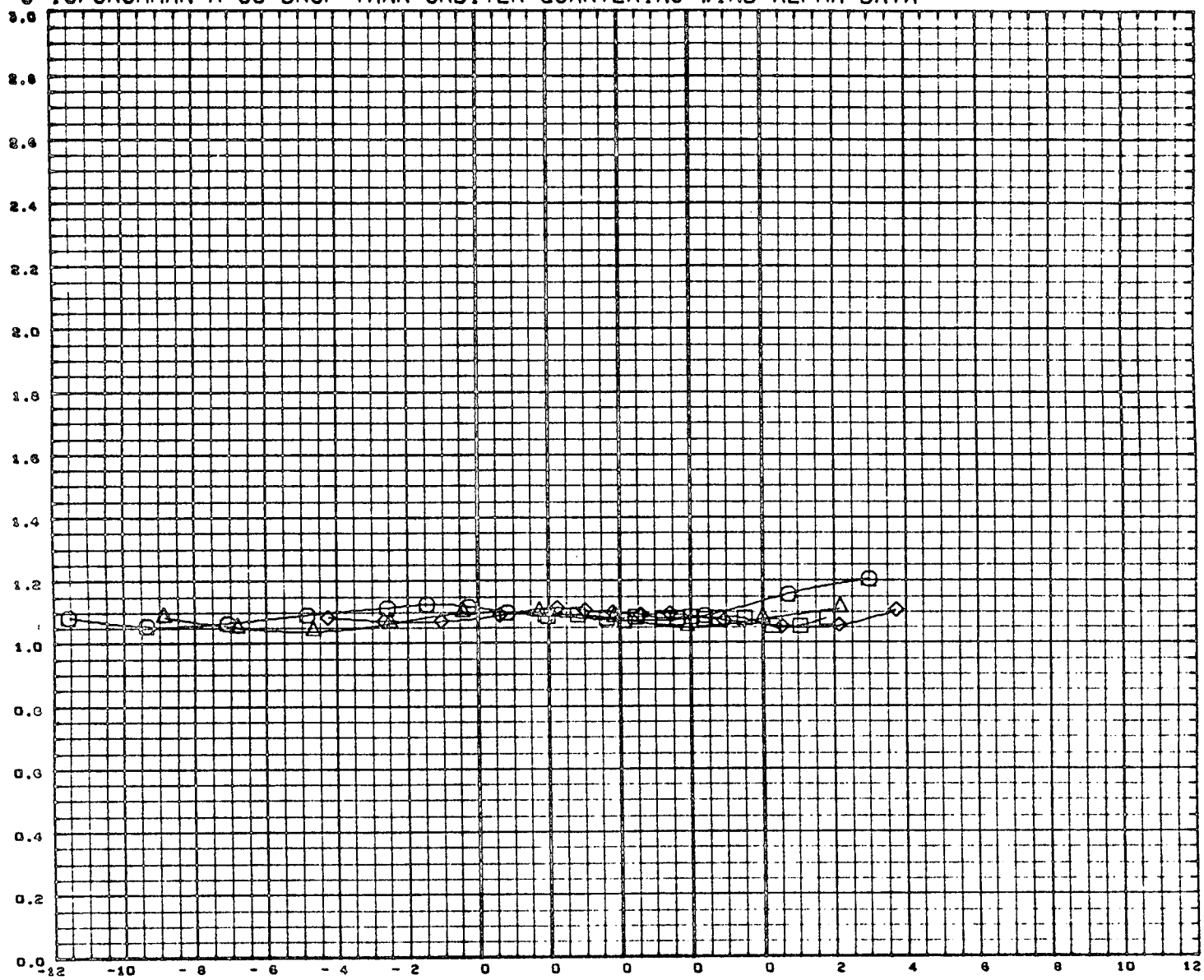
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	0.904
WNGINC	0.000

DATA SOURCE

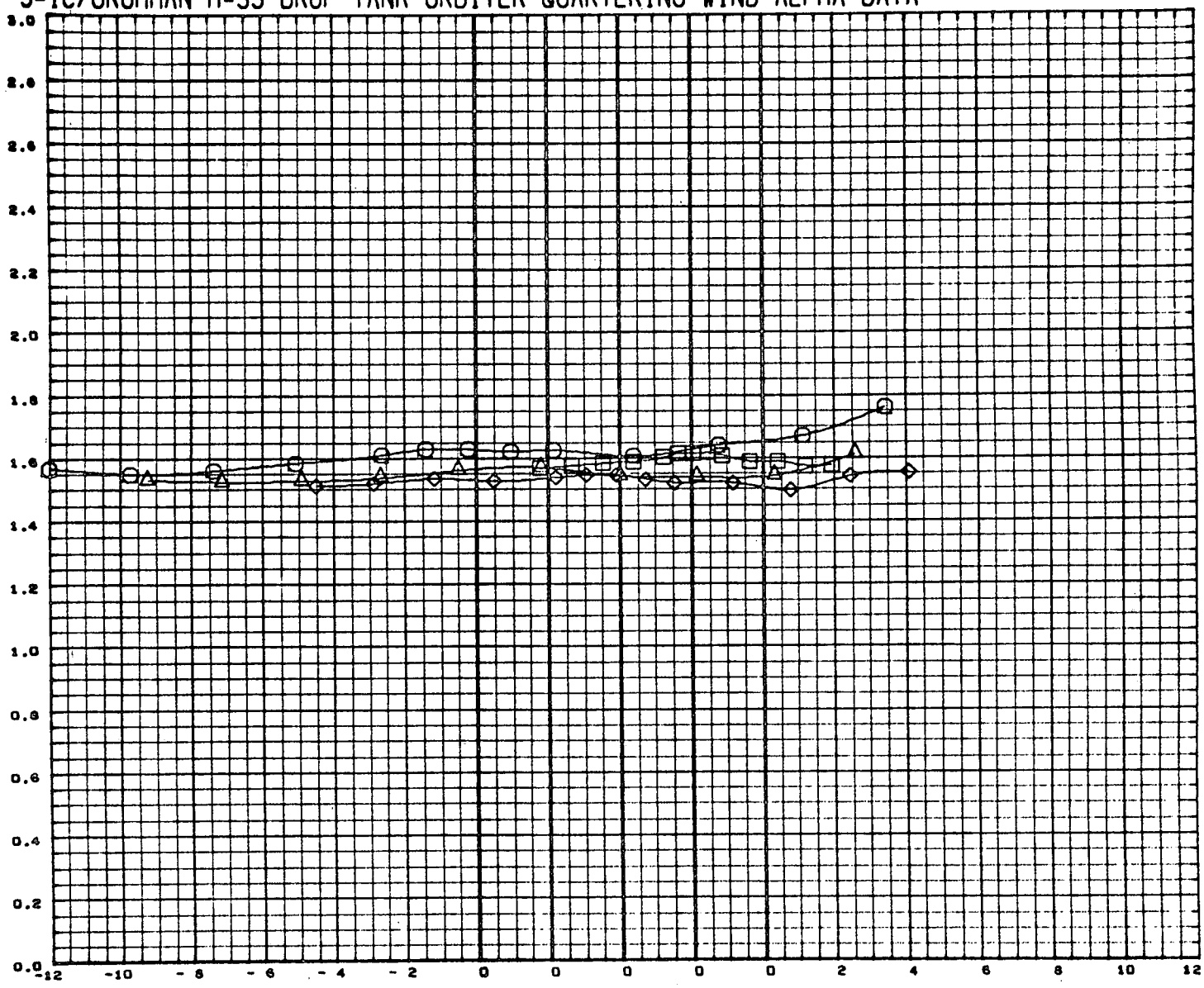
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC#A

S-IC/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	0.999
WNGINC	0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

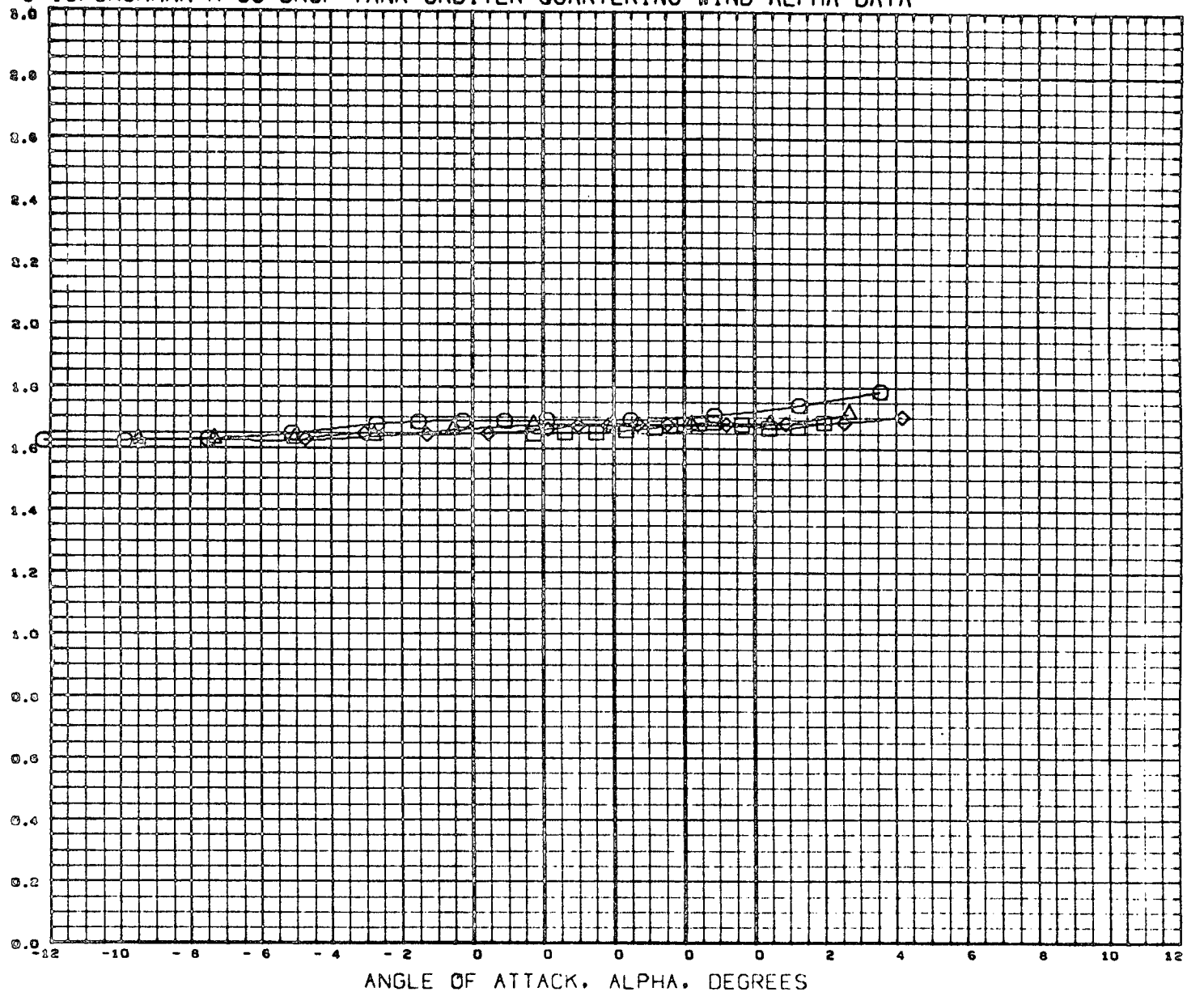
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

M502-MSFC-S1C H-33 ORBITER OWVTCBF (844041) 12 MAY 72 PAGE 103

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	1.202
WINGINC	0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

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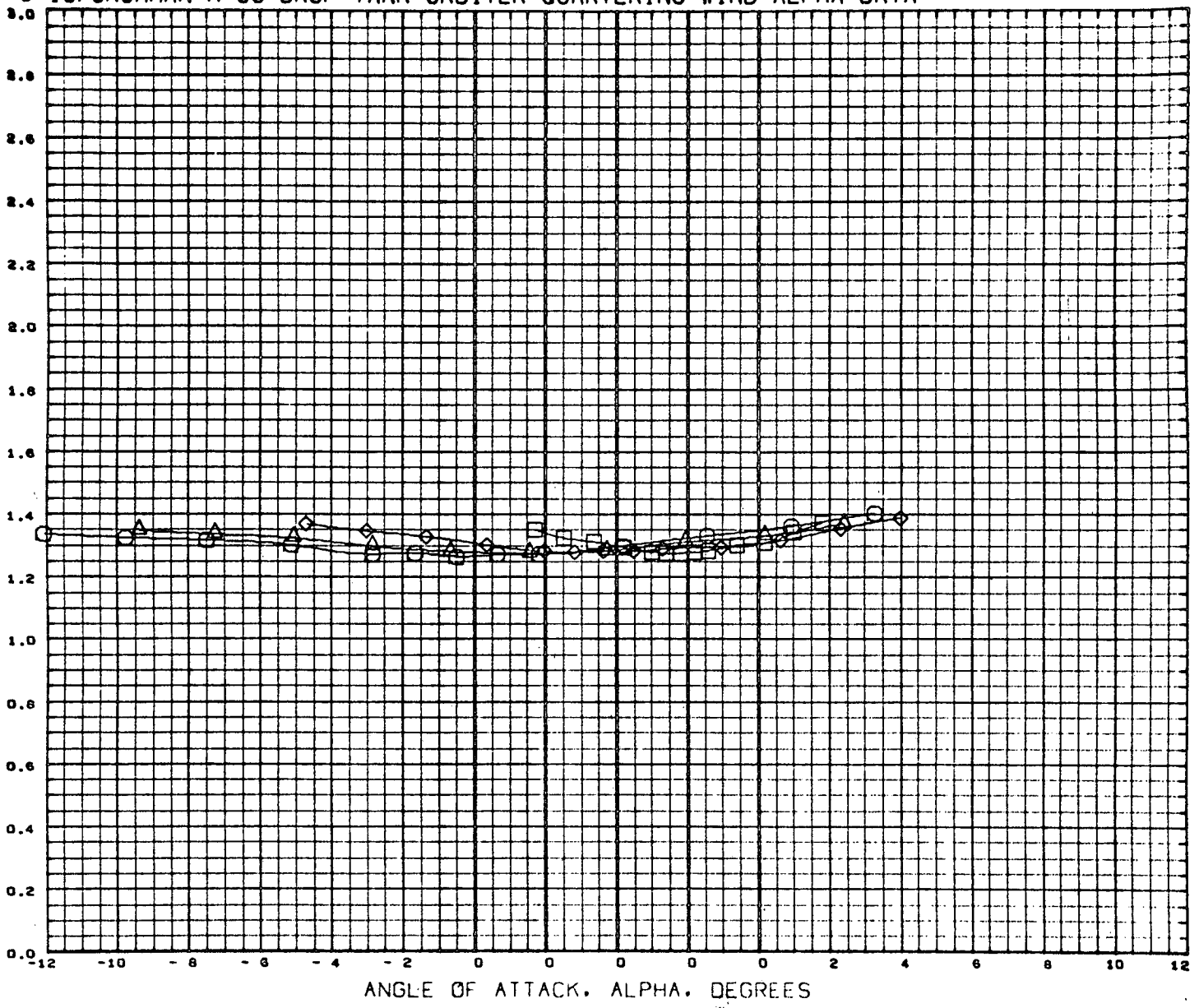
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	1.965
WNGINC	0.000

DATA SOURCE

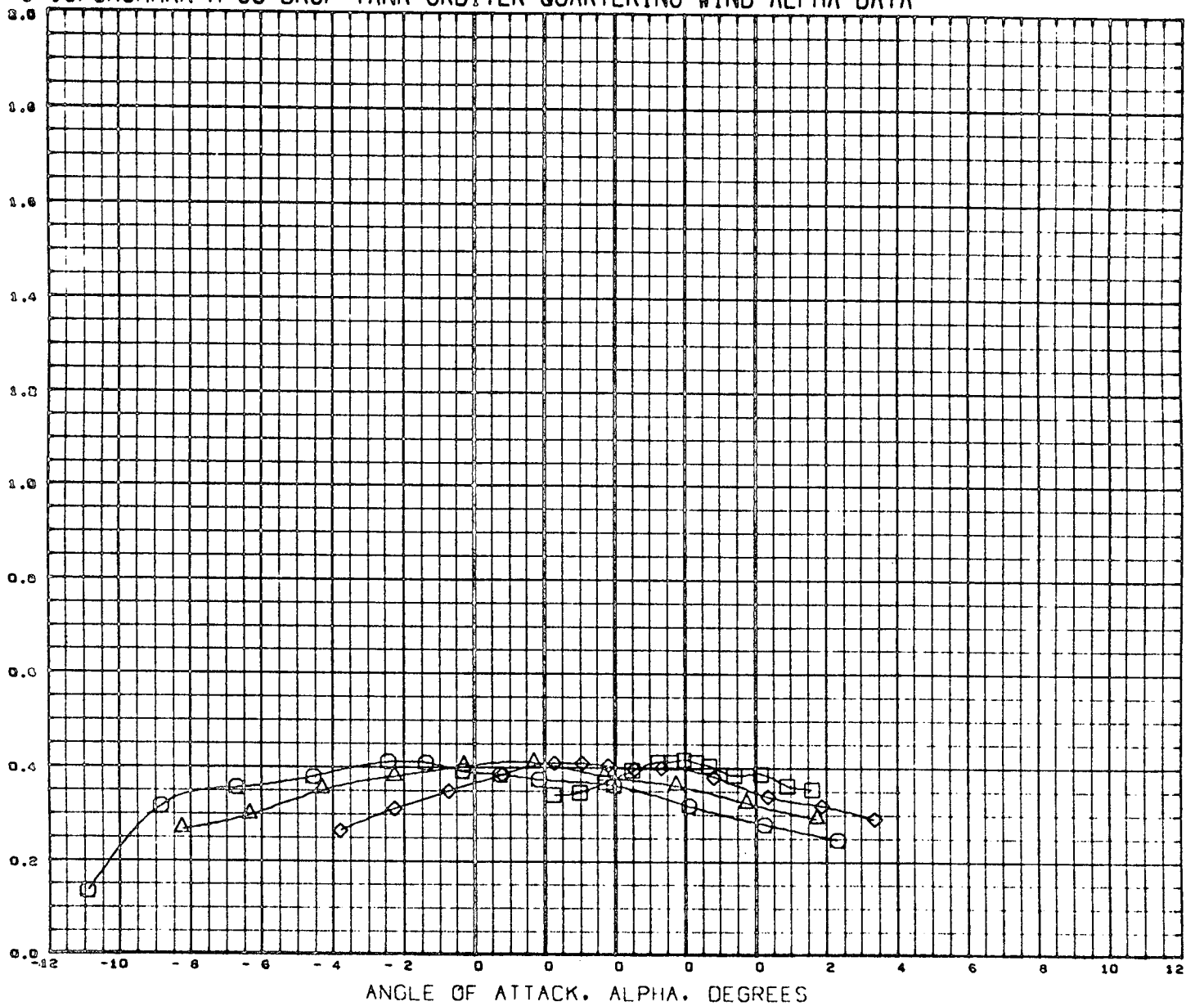
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	0.599
WNGINC	0.000

DATA SOURCE

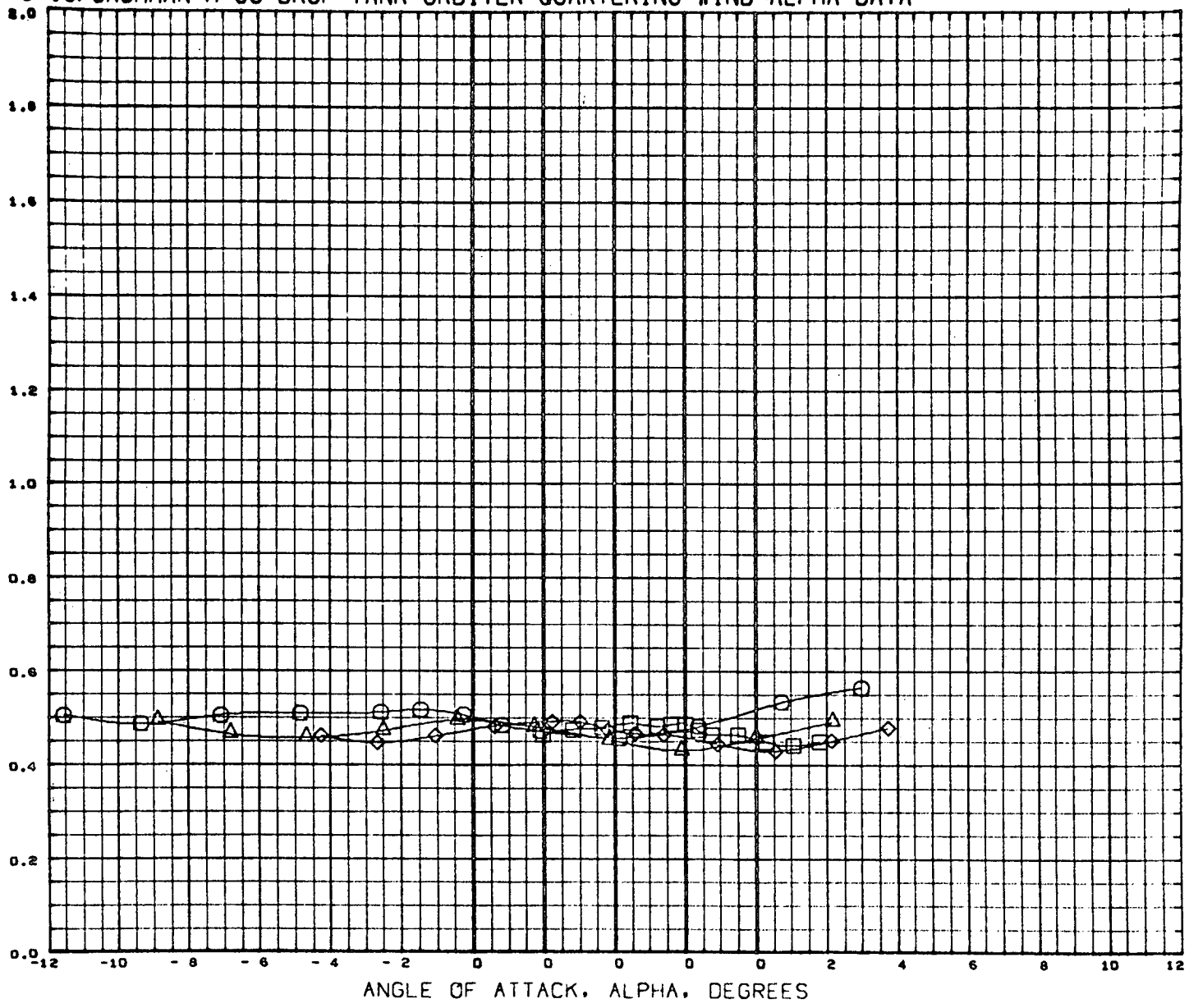
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH		0.904
WNGINC		0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

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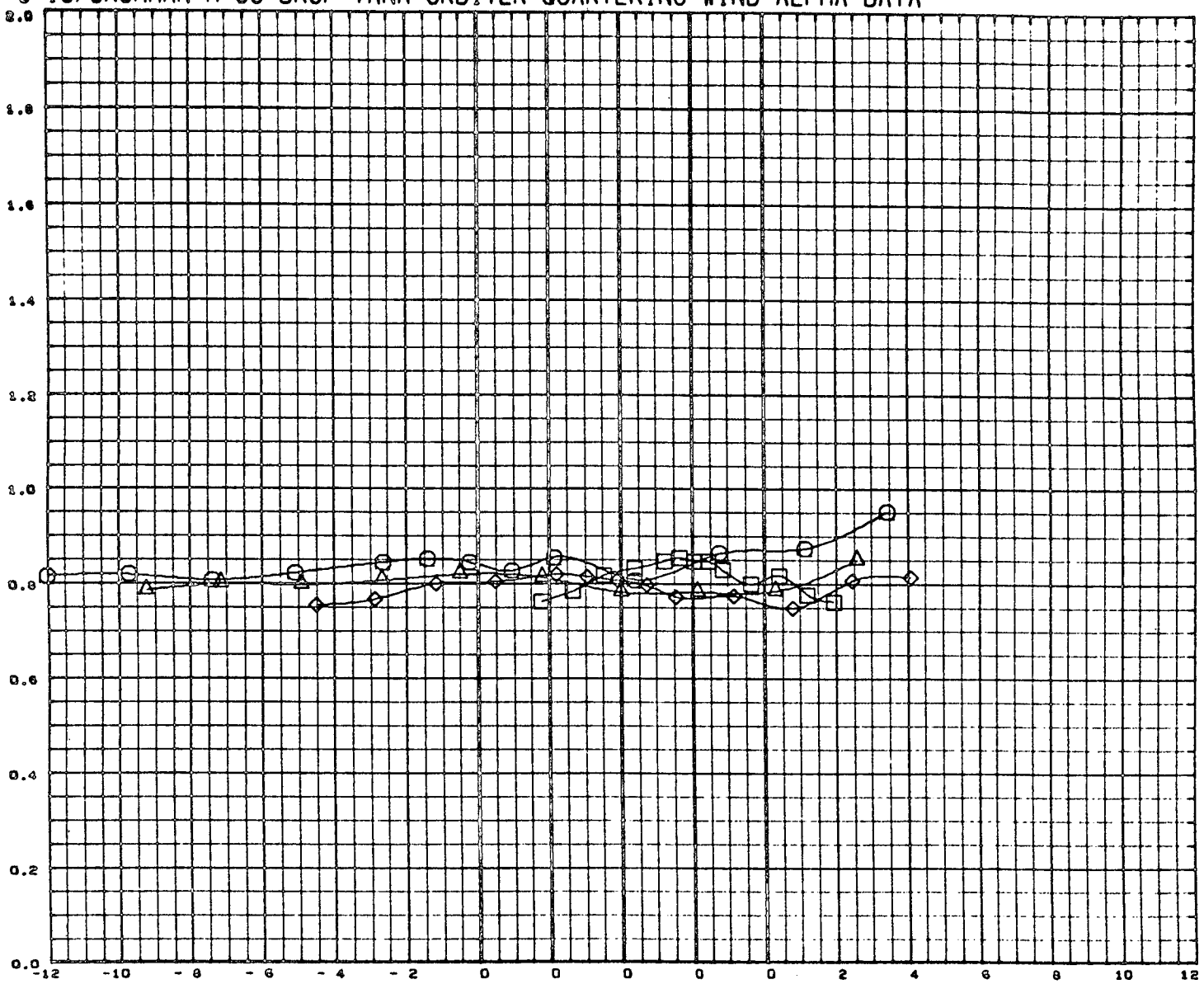
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	0.999
WNGINC	0.000

DATA SOURCE

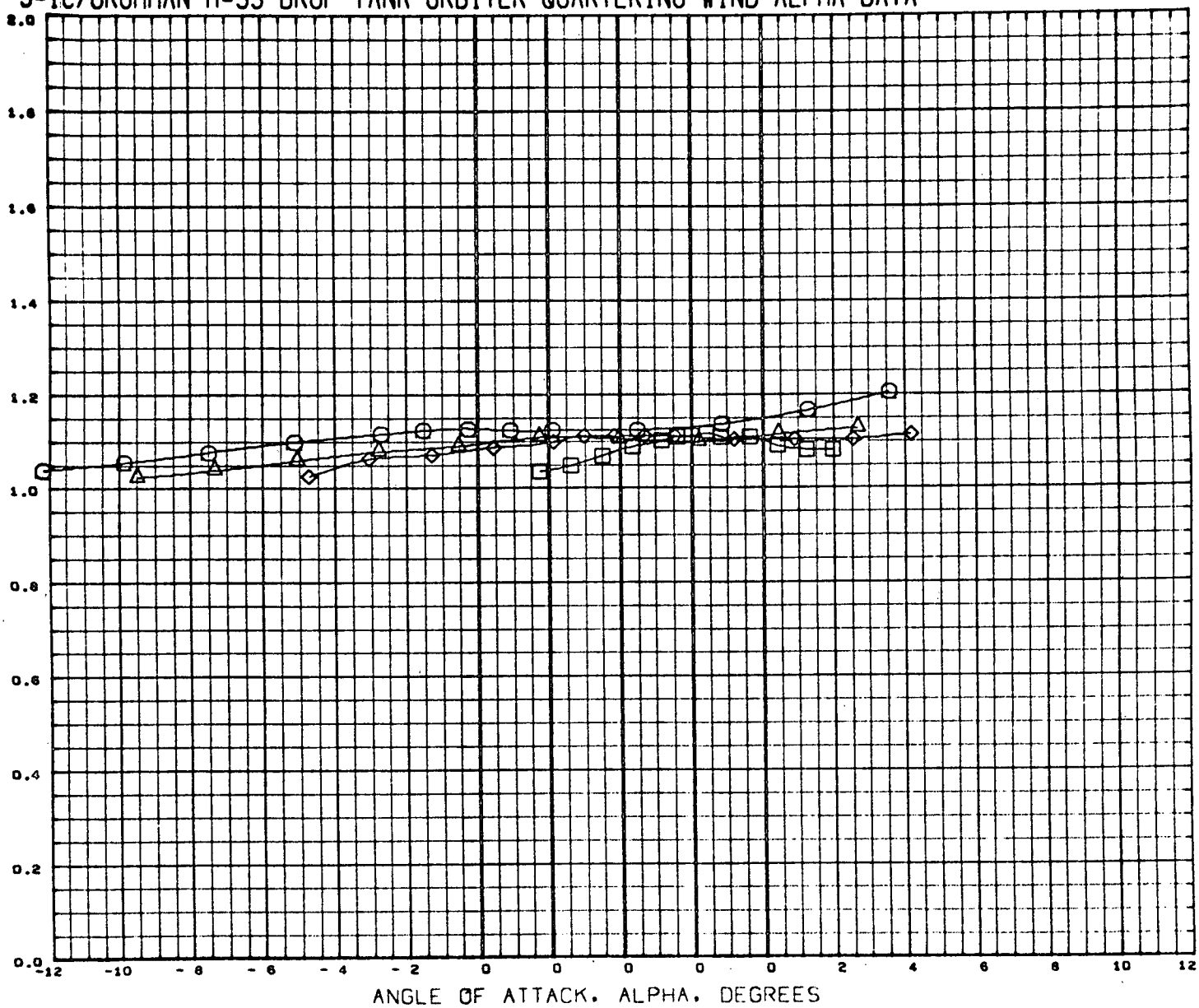
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
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△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	1.202
WNGINC	0.000

DATA SOURCE

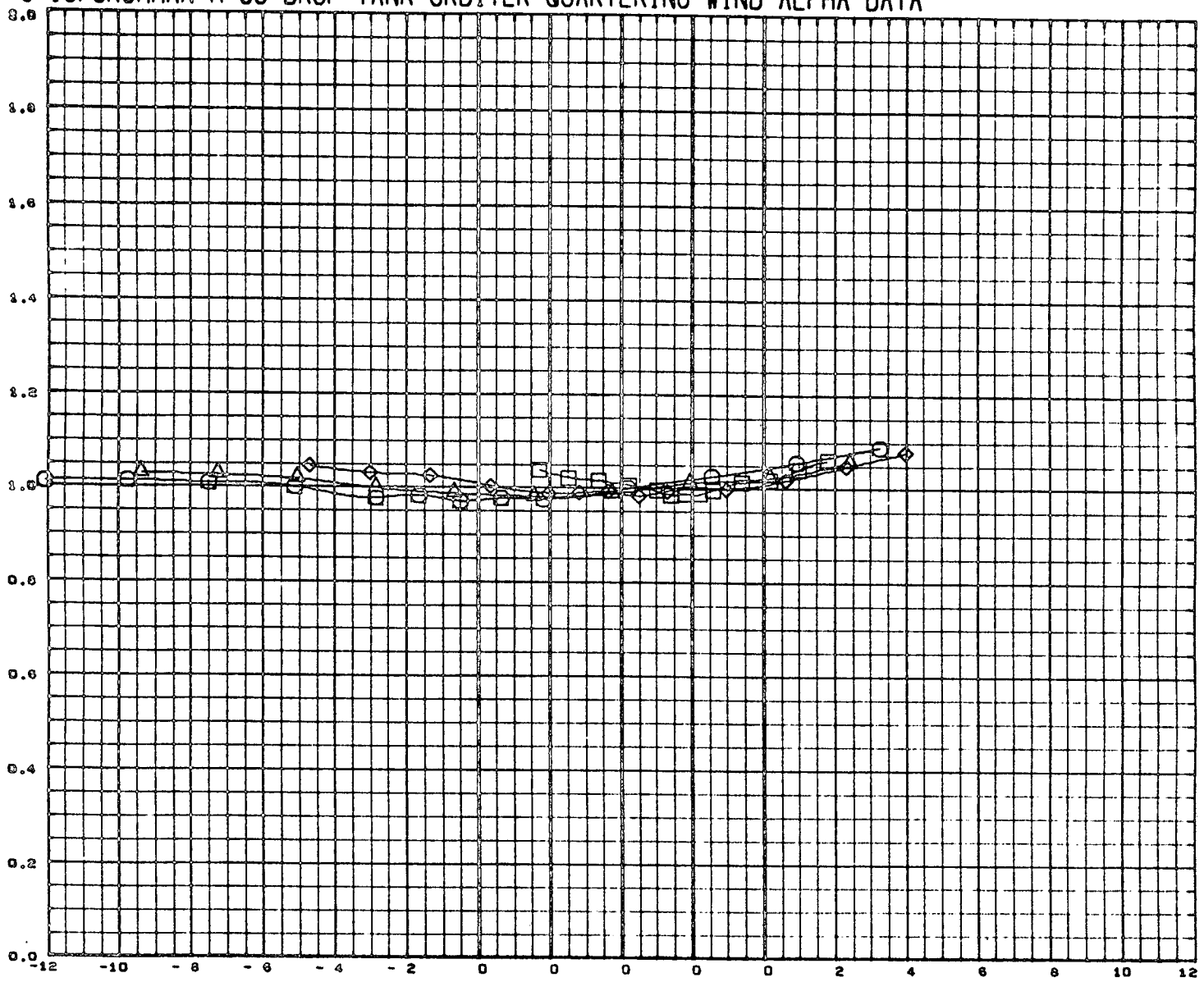
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
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△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	1.965
WNGINC	0.000

DATA SOURCE

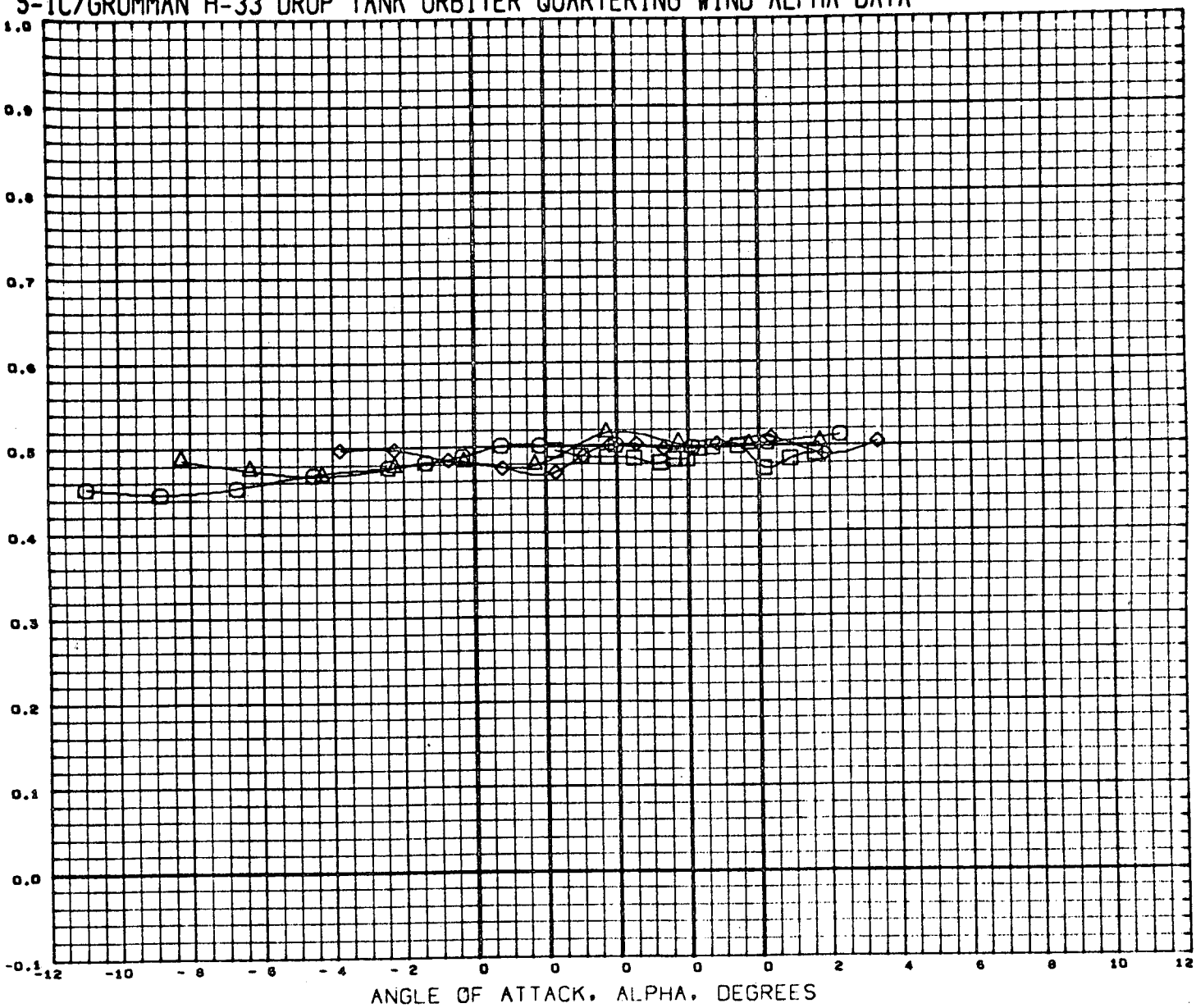
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
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△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	0.599
WNGINC	0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

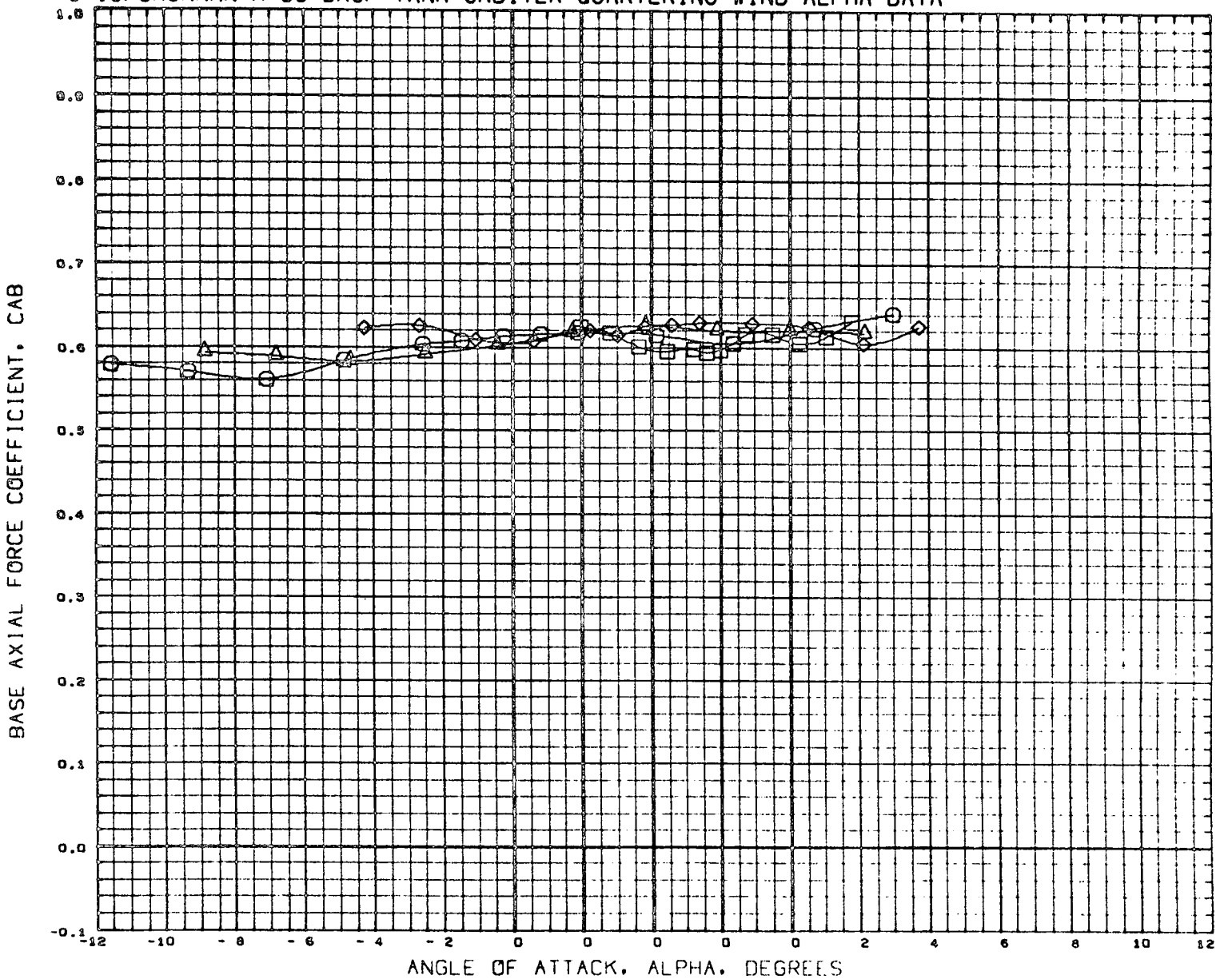
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

M502-MSFC-S1C H-33 ORBITER OWVTCBF (844041) 12 MAY 72 PAGE 111

S-IC/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
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△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	0.904
WNGINC	0.000

DATA SOURCE

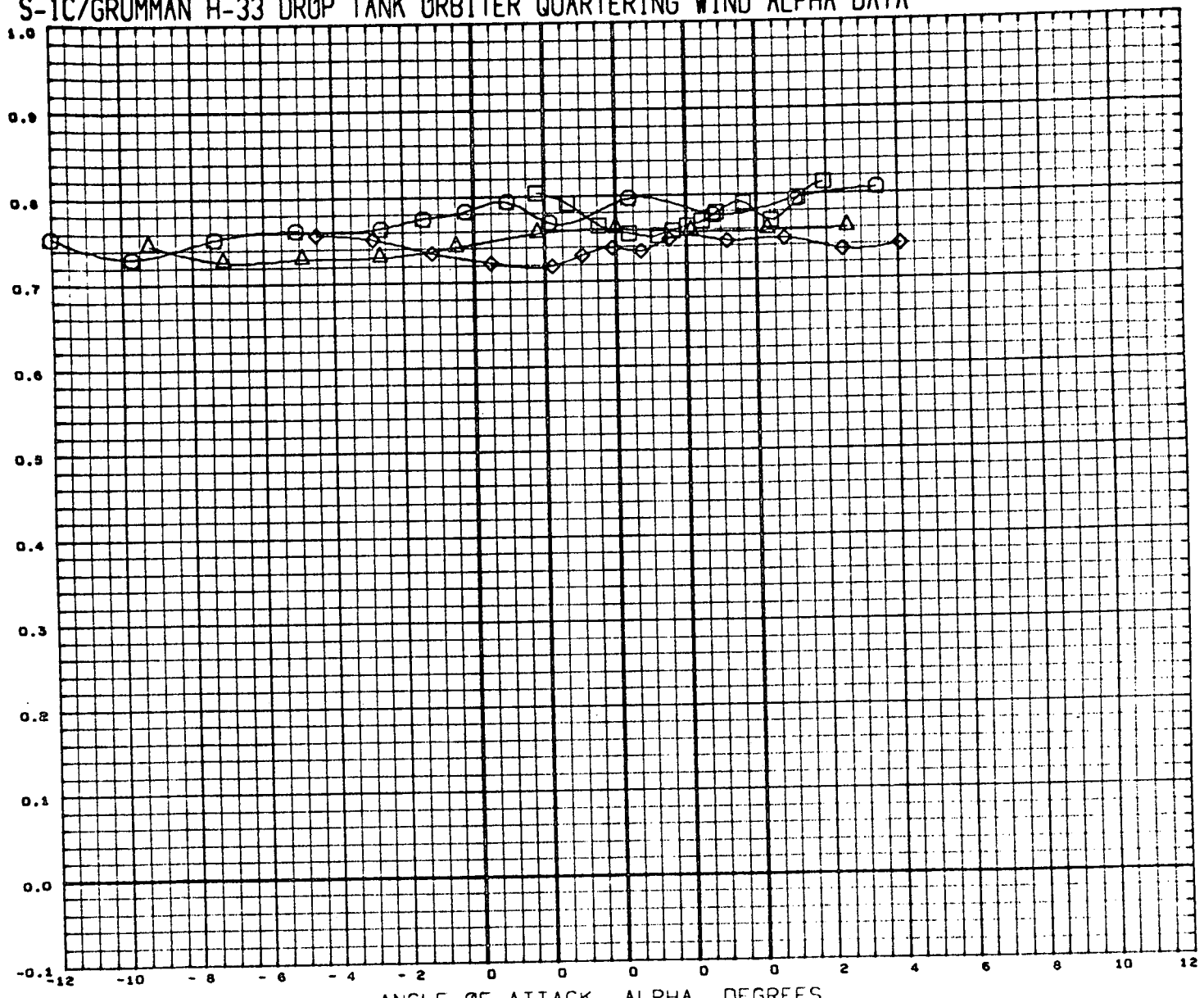
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
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△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	0.999
WNG INC	0.000

DATA SOURCE

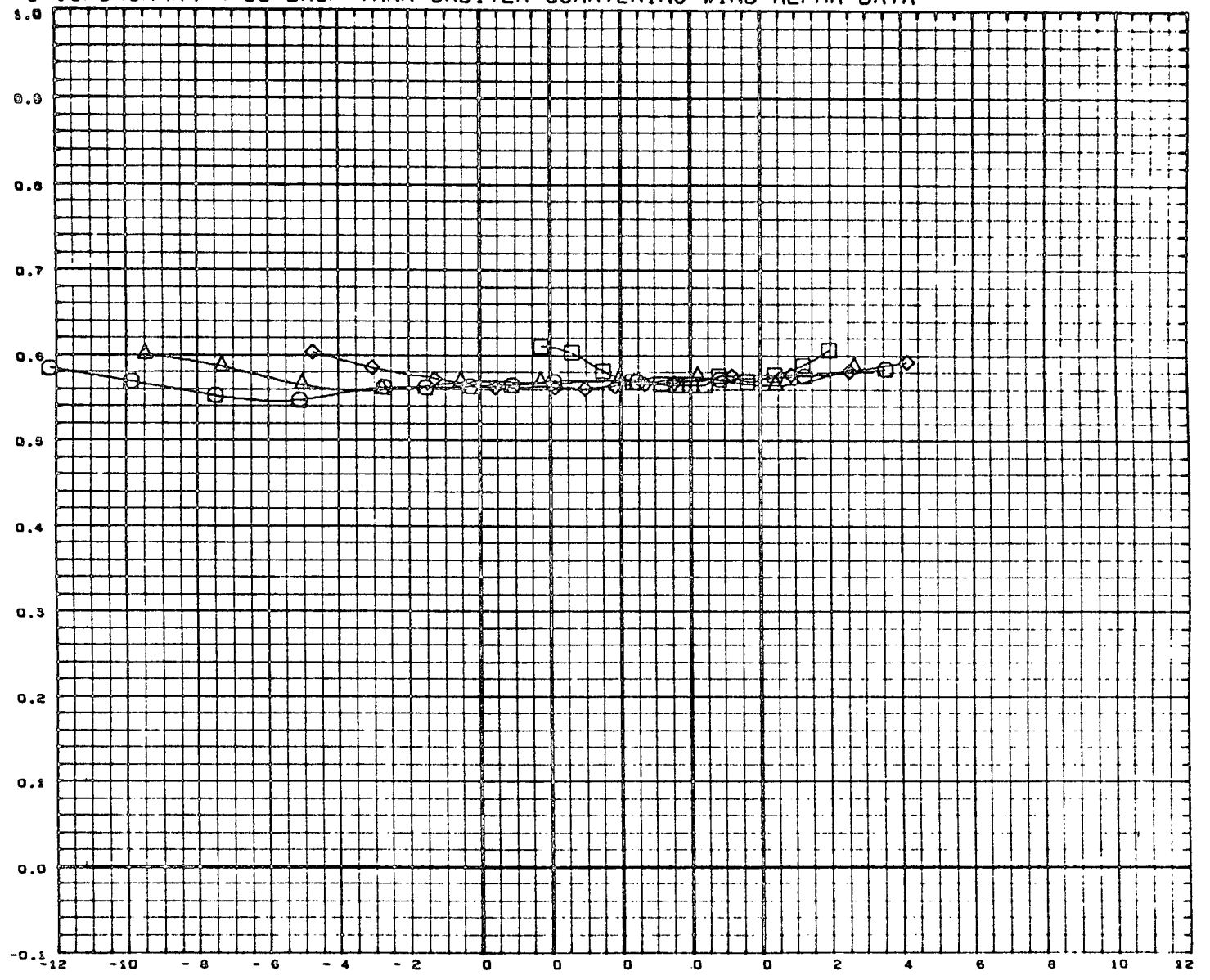
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	PARAMETRIC VALUES		DATA SOURCE				REFERENCE INFORMATION		
○	0.000	MACH	1.202	DATASET	PHI	DATASET	PHI	SREF	1.3960	SQ.IN.
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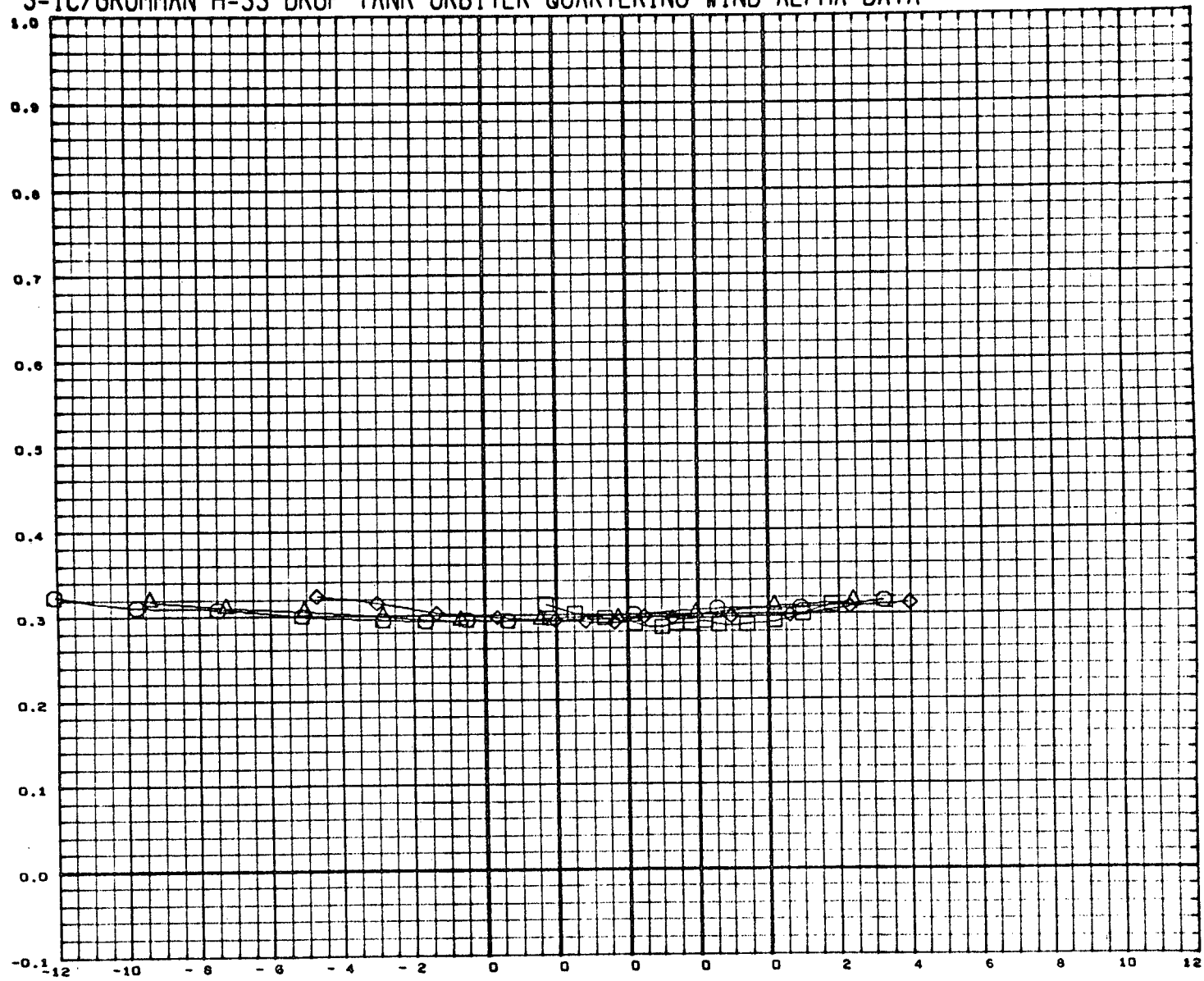
◇	45.000			Y44043	45.000	Y44044	70.000	BREF	1.3330	IN.
□	70.000							XMRP	5.3990	IN.
								YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
								SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	1.965
WNGINC	0.000

DATA SOURCE

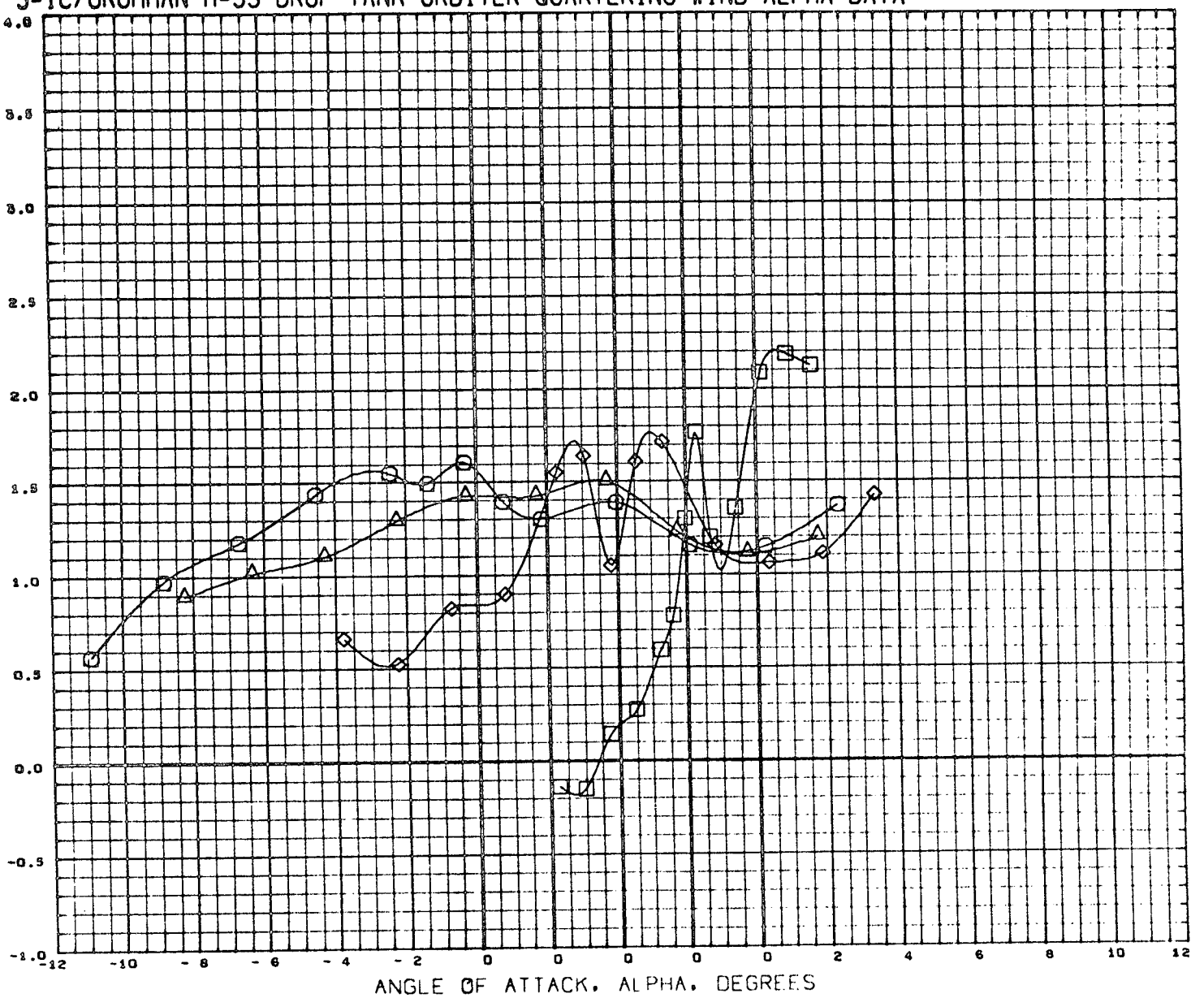
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
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△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	0.899
WINGINC	0.000

DATA SOURCE

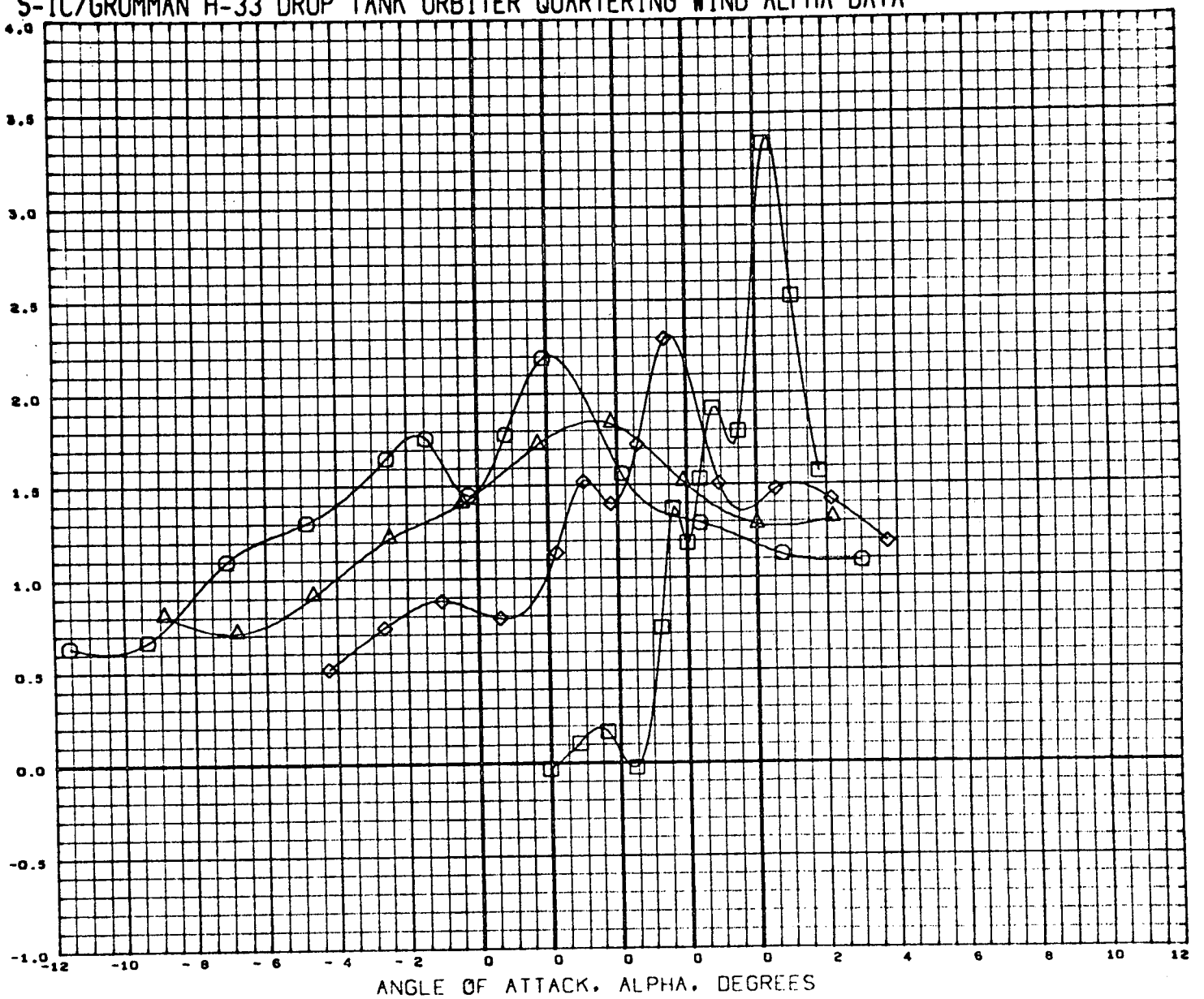
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	0.904
WNGINC	0.000

DATA SOURCE

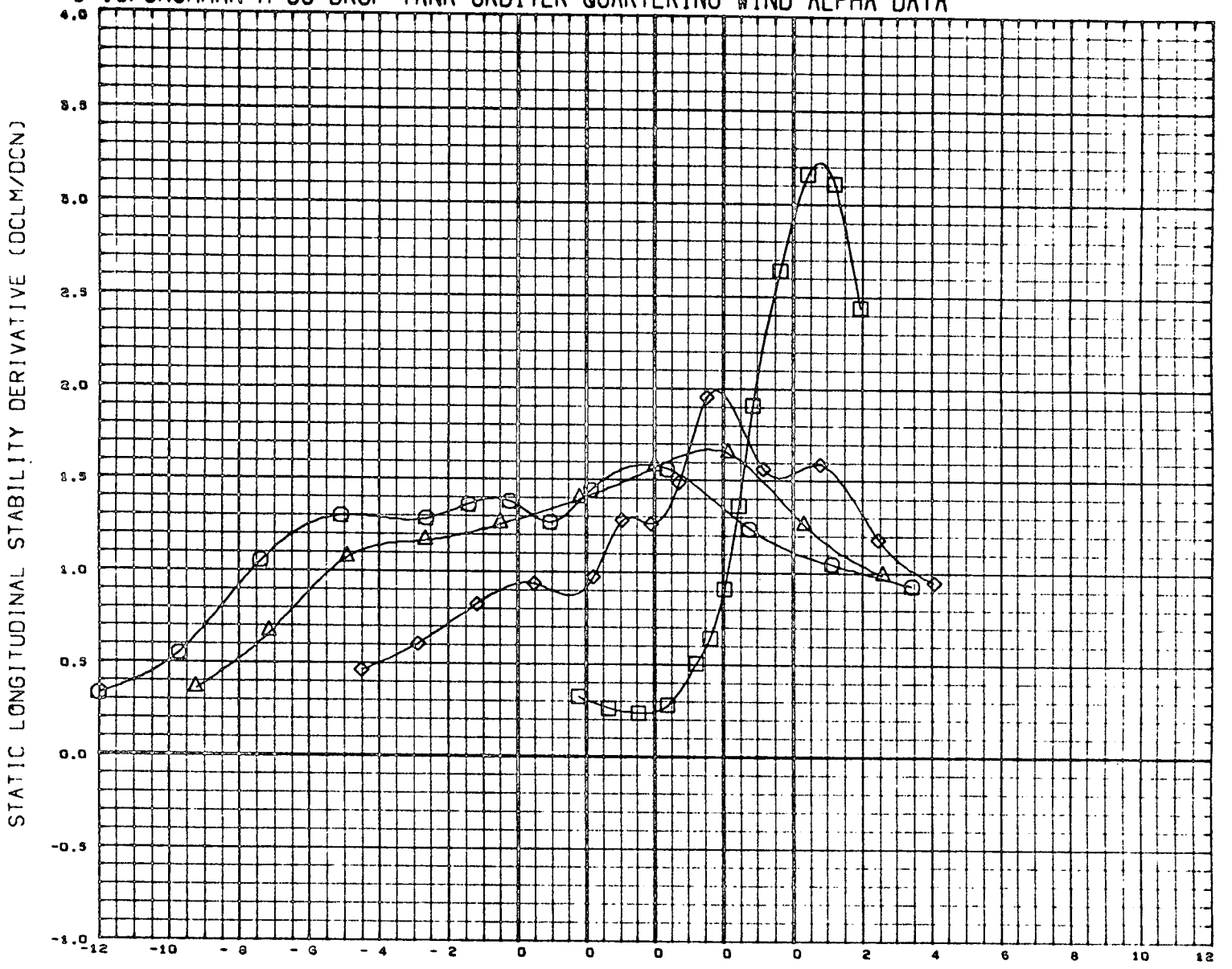
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
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△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	0.999
WNGTNC	0.000

DATA SOURCE

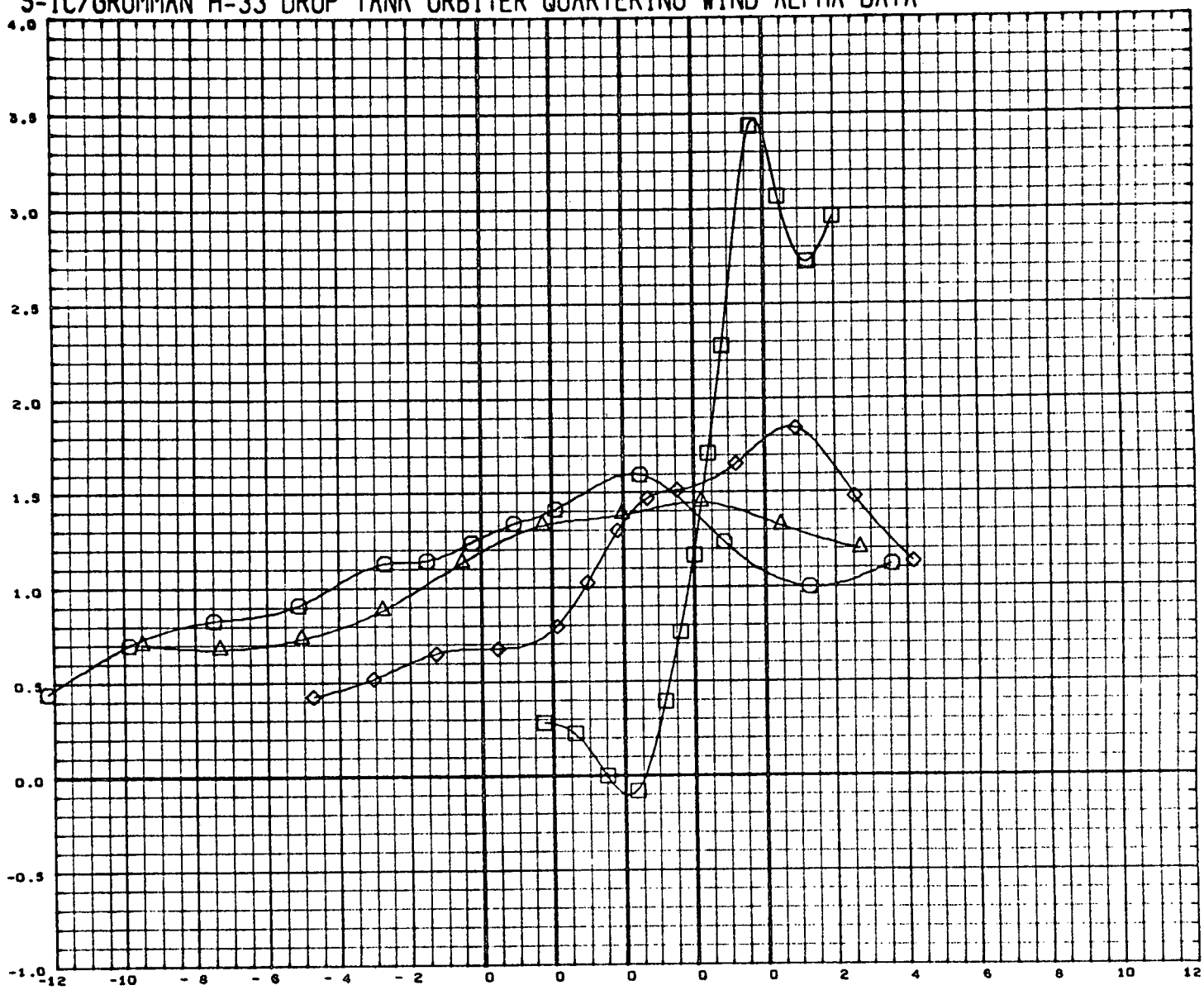
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI
○	0.000
△	20.000
◇	45.000
□	70.000

PARAMETRIC VALUES

MACH	1.202
WNGINC	0.000

DATA SOURCE

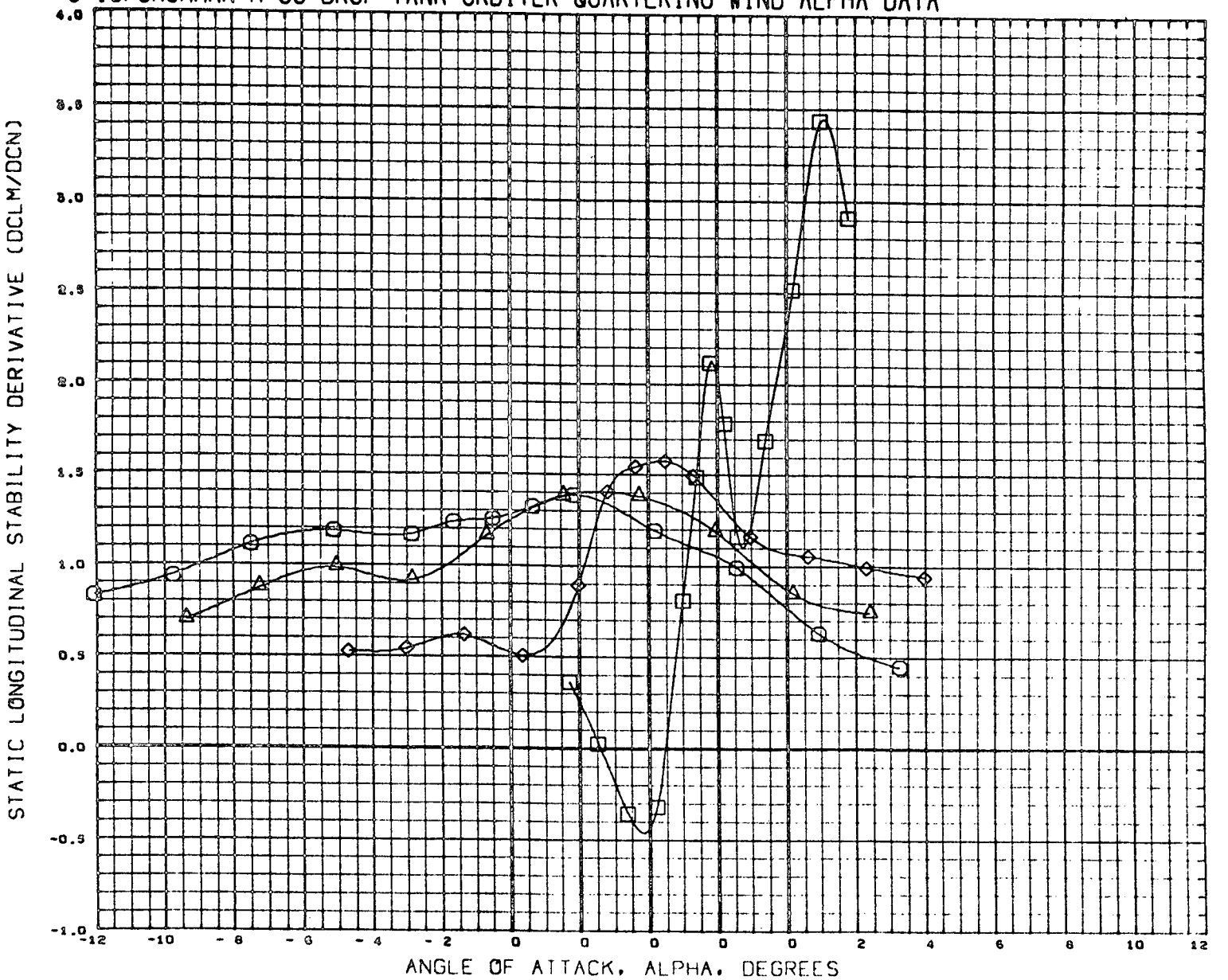
DATASET	PHI	DATASET	PHI
844041	0.000	Y44042	20.000
Y44043	45.000	Y44044	70.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC*A

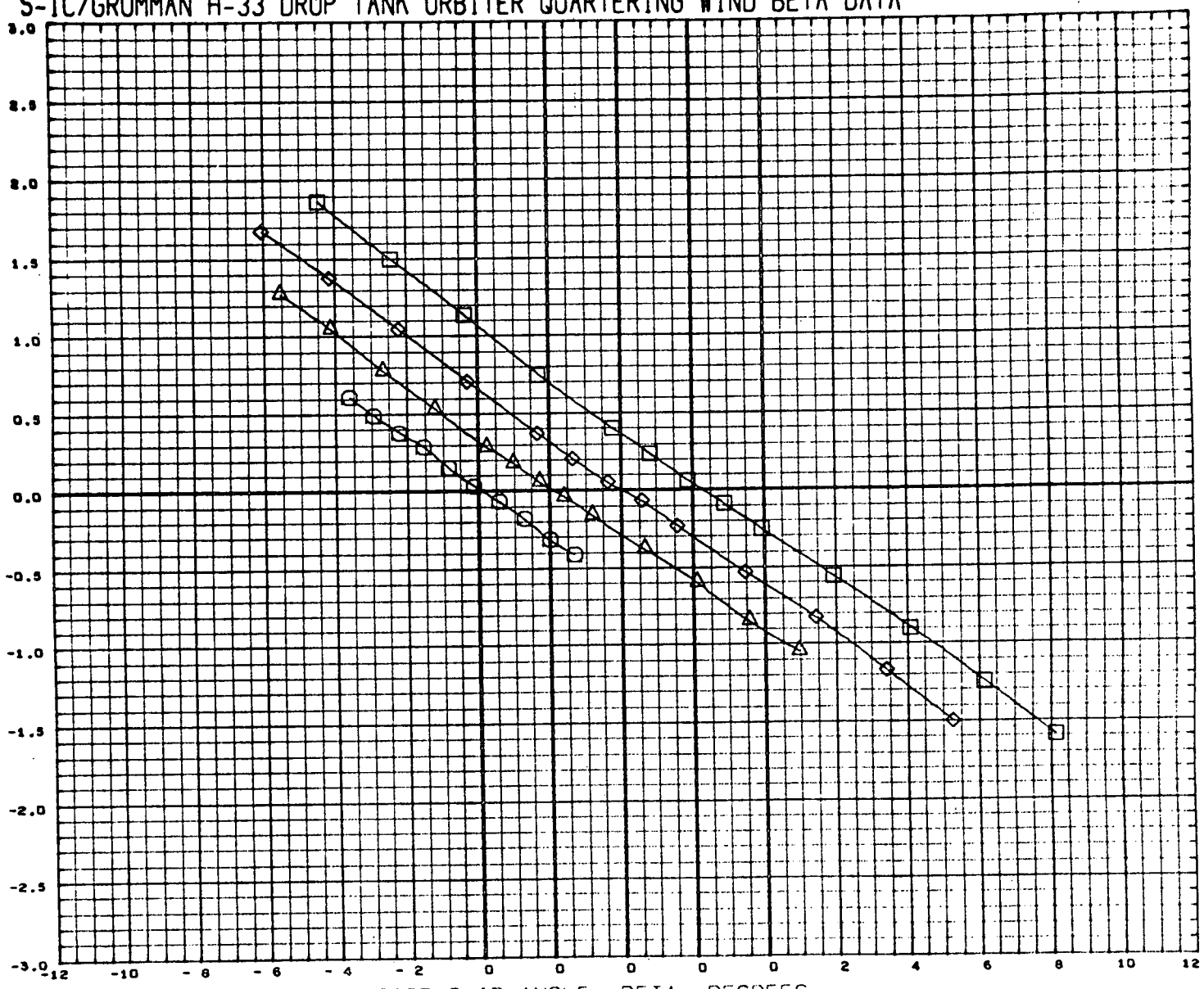
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	PARAMETRIC VALUES		DATA SOURCE				REFERENCE INFORMATION		
○	0.000	MACH	1.965	DATASET	PHI	DATASET	PHI	SREF	1.3960	SQ.IN.
△	20.000	WNGINC	0.000	844041	0.000	Y44042	20.000	LREF	1.3330	IN.
◇	45.000			Y44043	45.000	Y44044	70.000	CREF	1.3330	IN.
□	70.000							XMRP	5.3990	IN.
								YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
								SCALE	0.0034	

DATA HIST. CODE CCCGC*A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
✕	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 0.599 WNGINC 0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

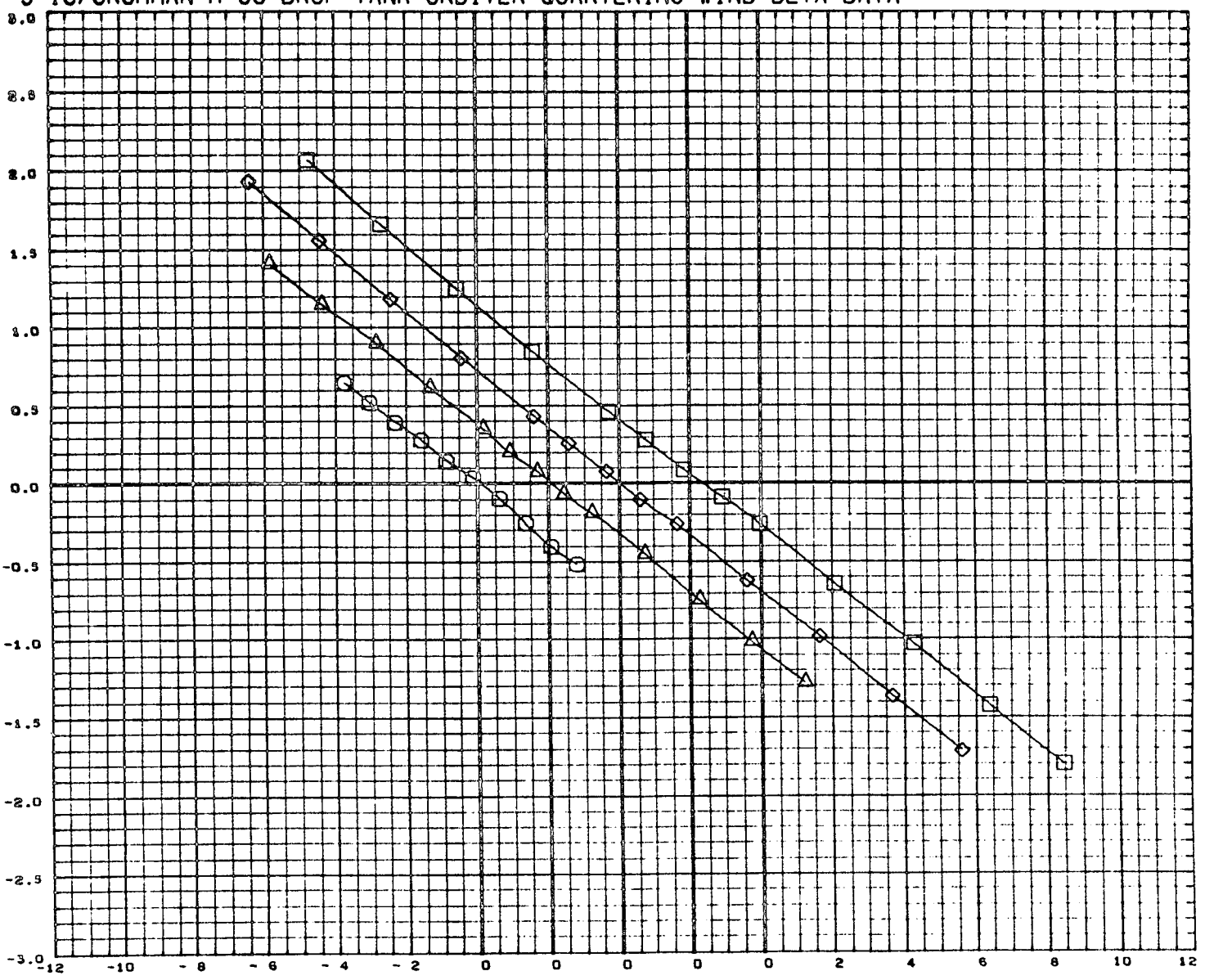
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

MS02-MSFC-S1C H-33 ORBITER (ROLL) OWVTCBF (C44042) 12 MAY 72

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
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△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 0.899 WNGINC 0.000

DATA SOURCE

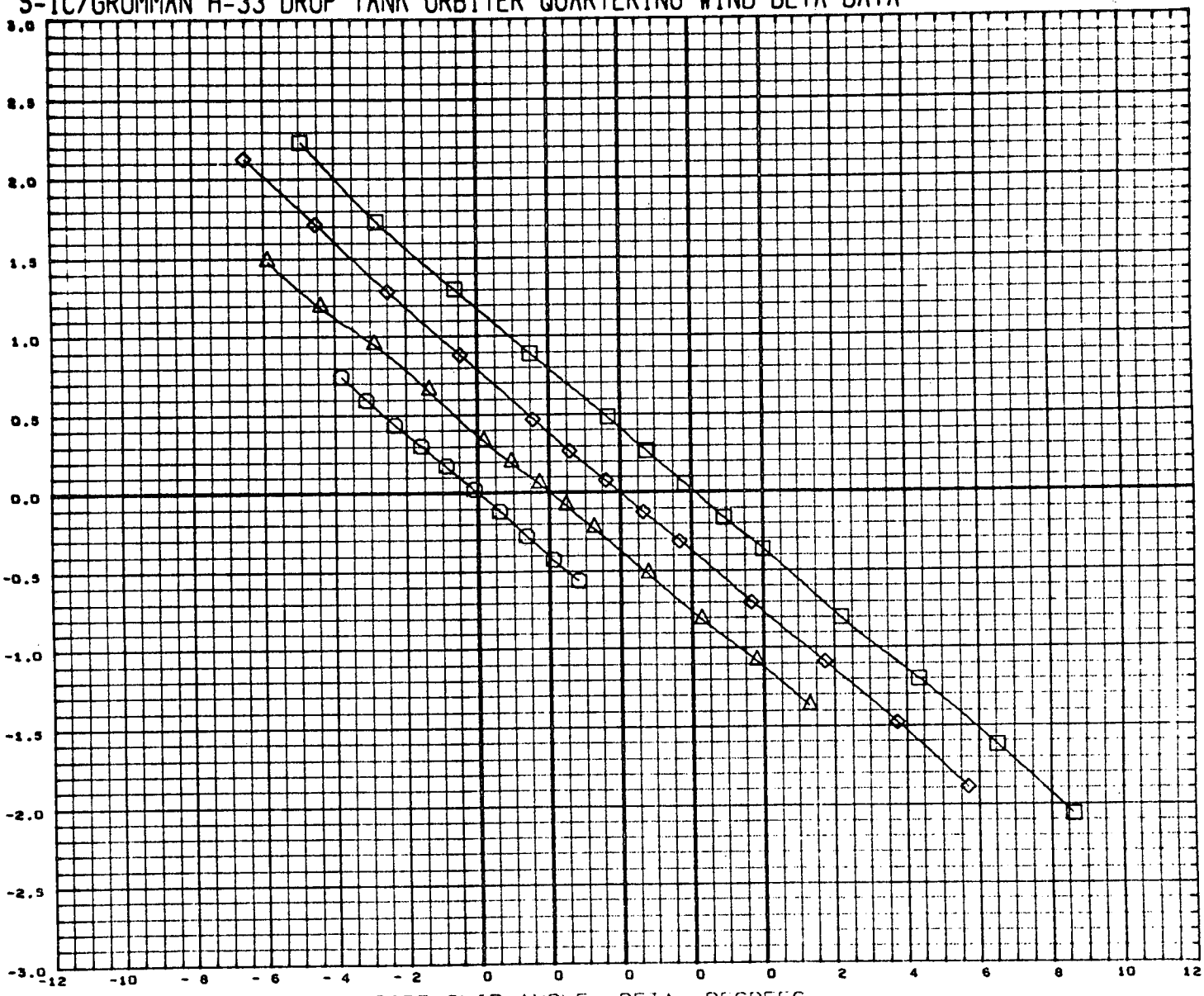
DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 1.001 WNGINC 0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

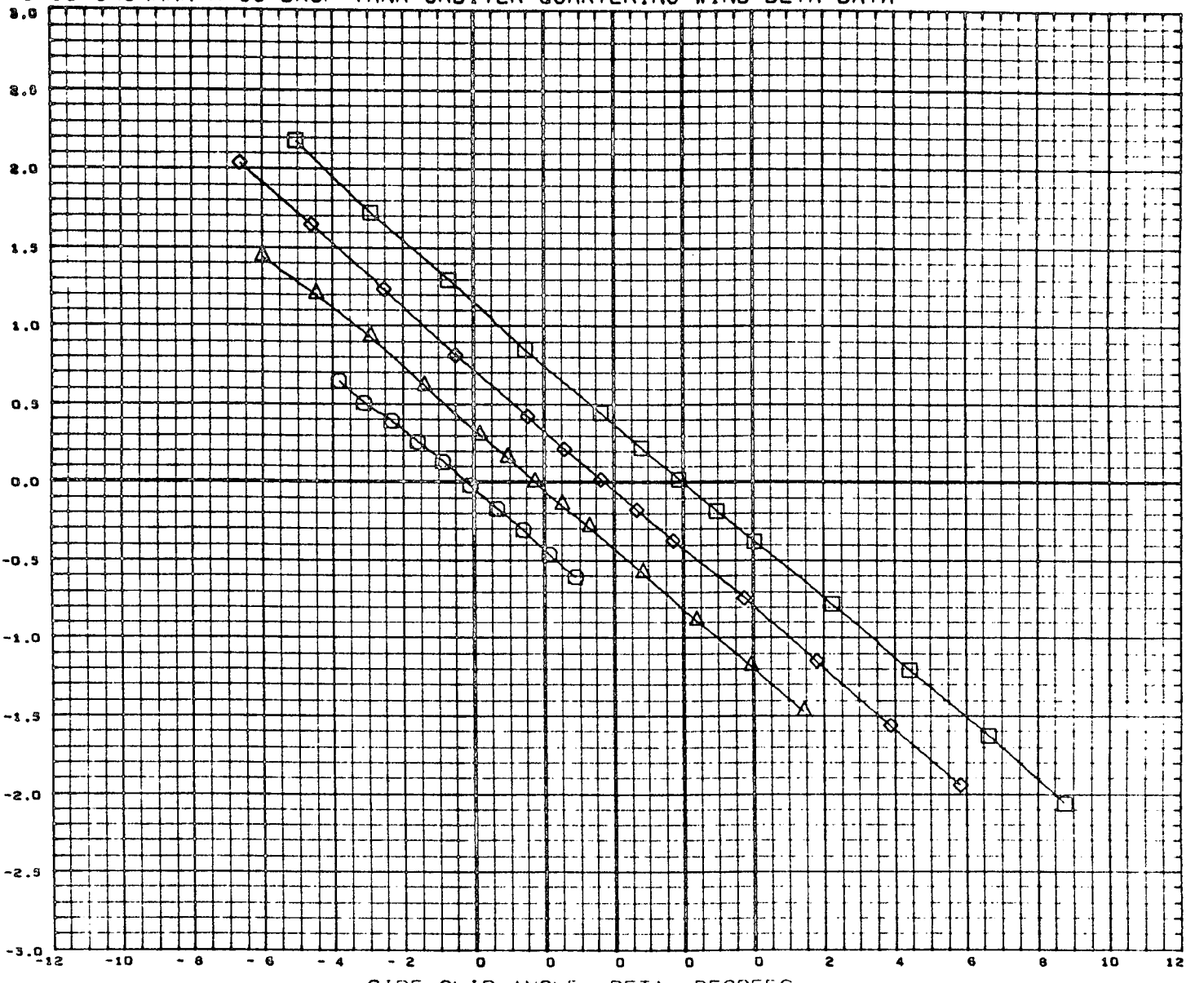
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

M502-MSFC-S1C H-33 ORBITER (ROLL) OWVTCBF (C44042) 12 MAY 72 PAGE 123

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
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△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES: MACH 1.198 WNGINC 0.000

DATA SOURCE

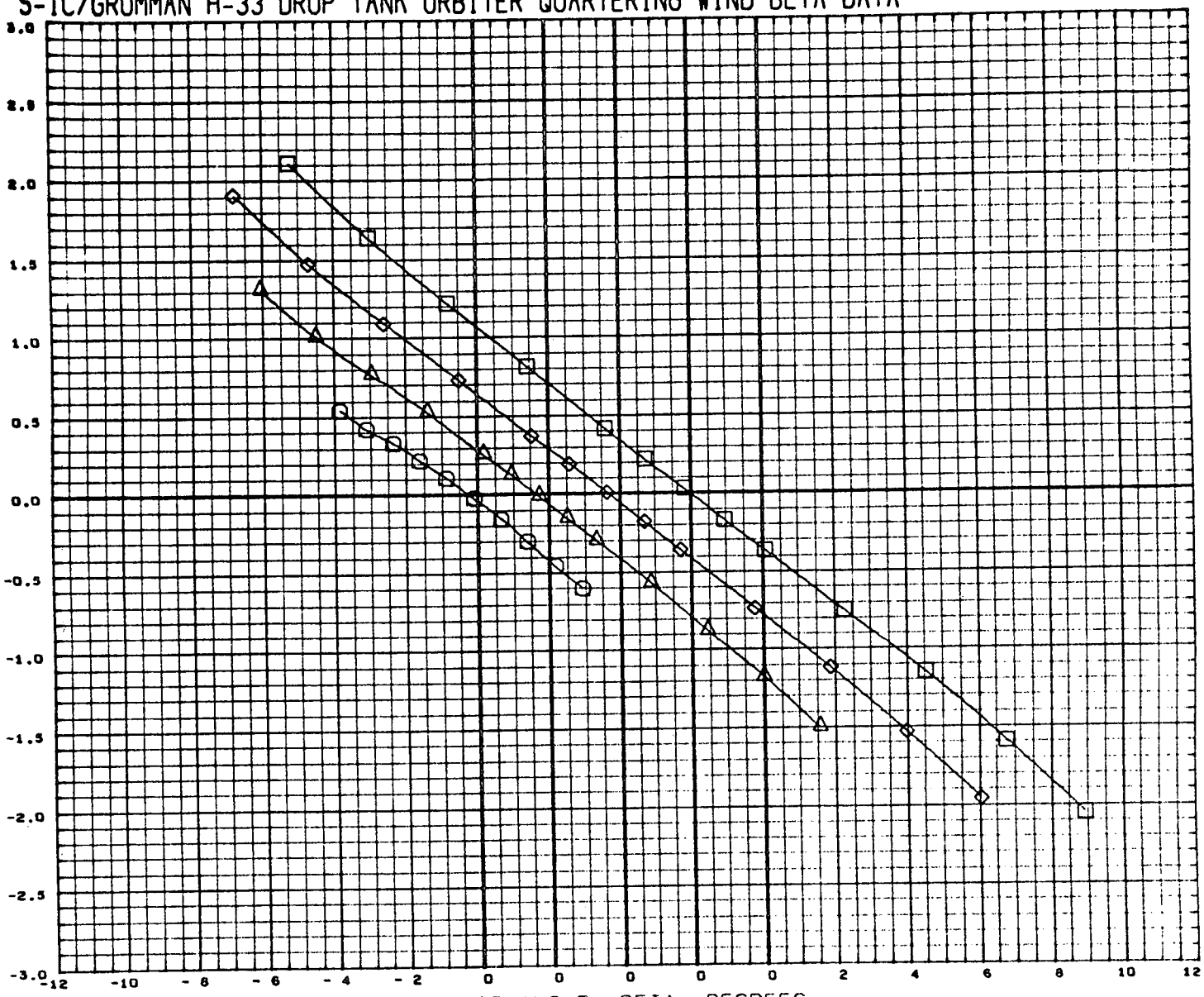
DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
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△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 1.964 WNGINC 0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

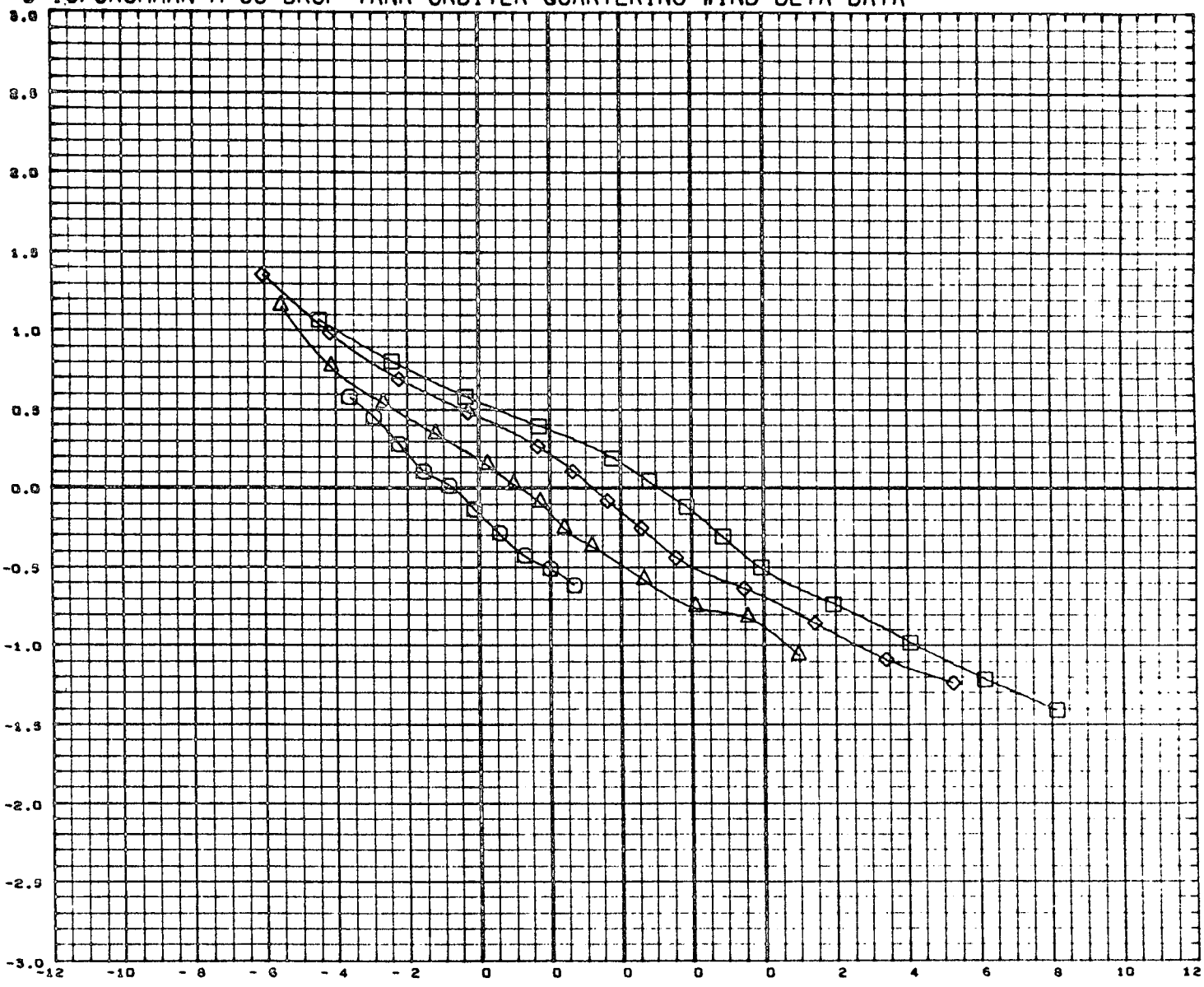
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

M5C2-MSFC-S1C H-33 ORBITER (ROLL) OWVTCBF (C44042) 12 MAY 72 PAGE 125

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES: MACH 0.599 WNGINC 0.000

DATA SOURCE

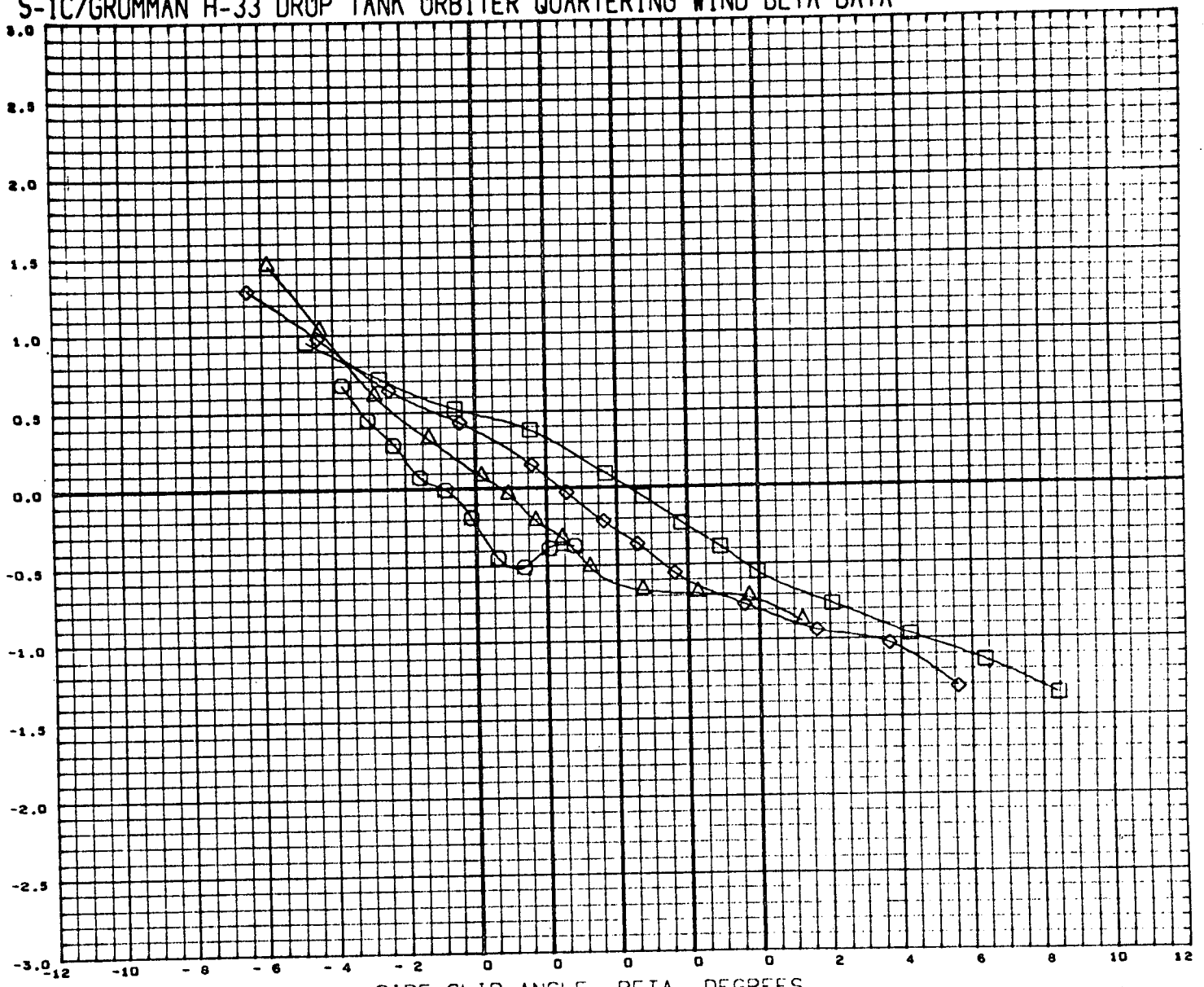
DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA MIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 0.899 WNGINC 0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

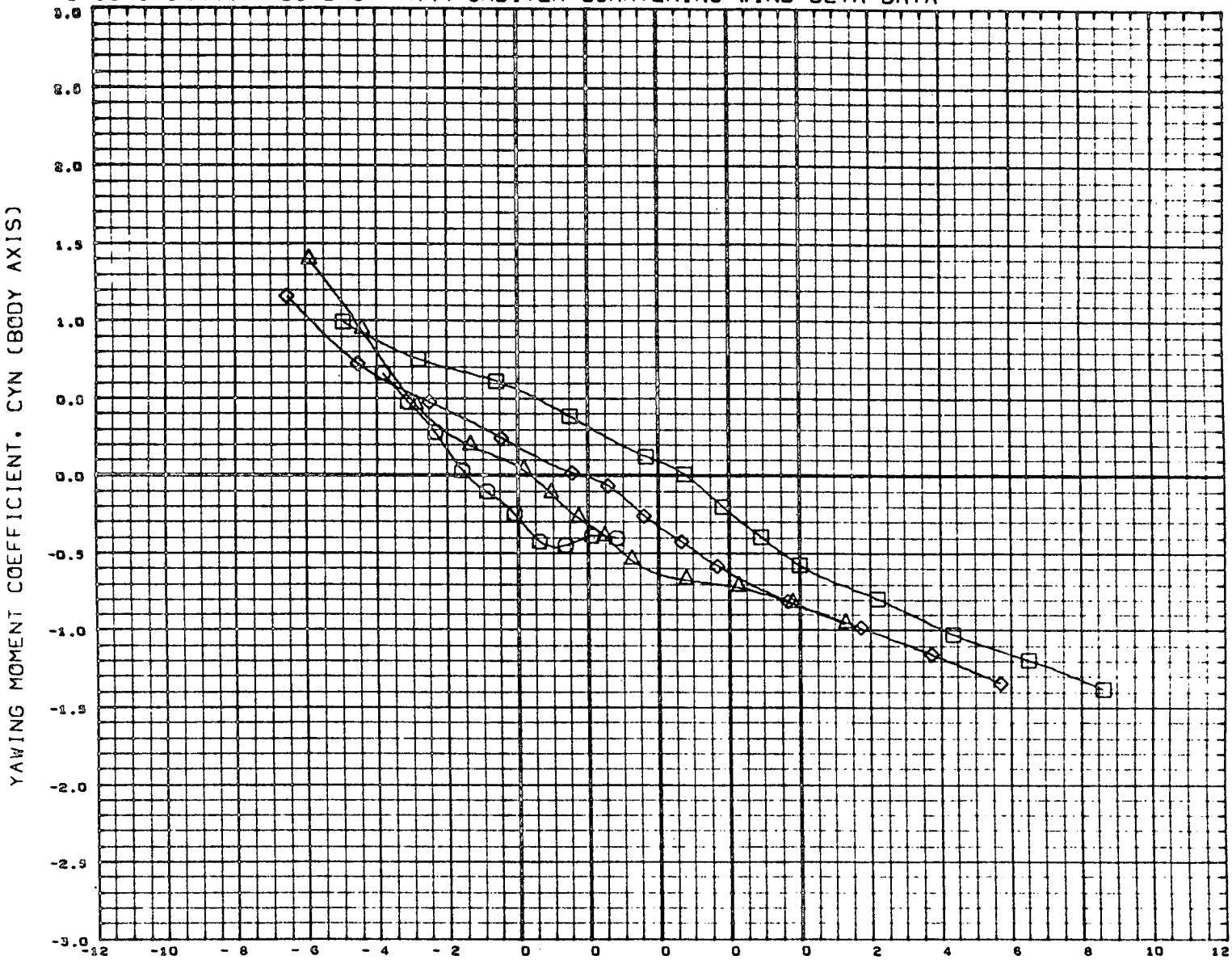
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

M502-MSFC-S1C H-33 ORBITER (ROLL) OWVTCBF (C44042) 12 MAY 72

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES: MACH 1.001 WNGINC 0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

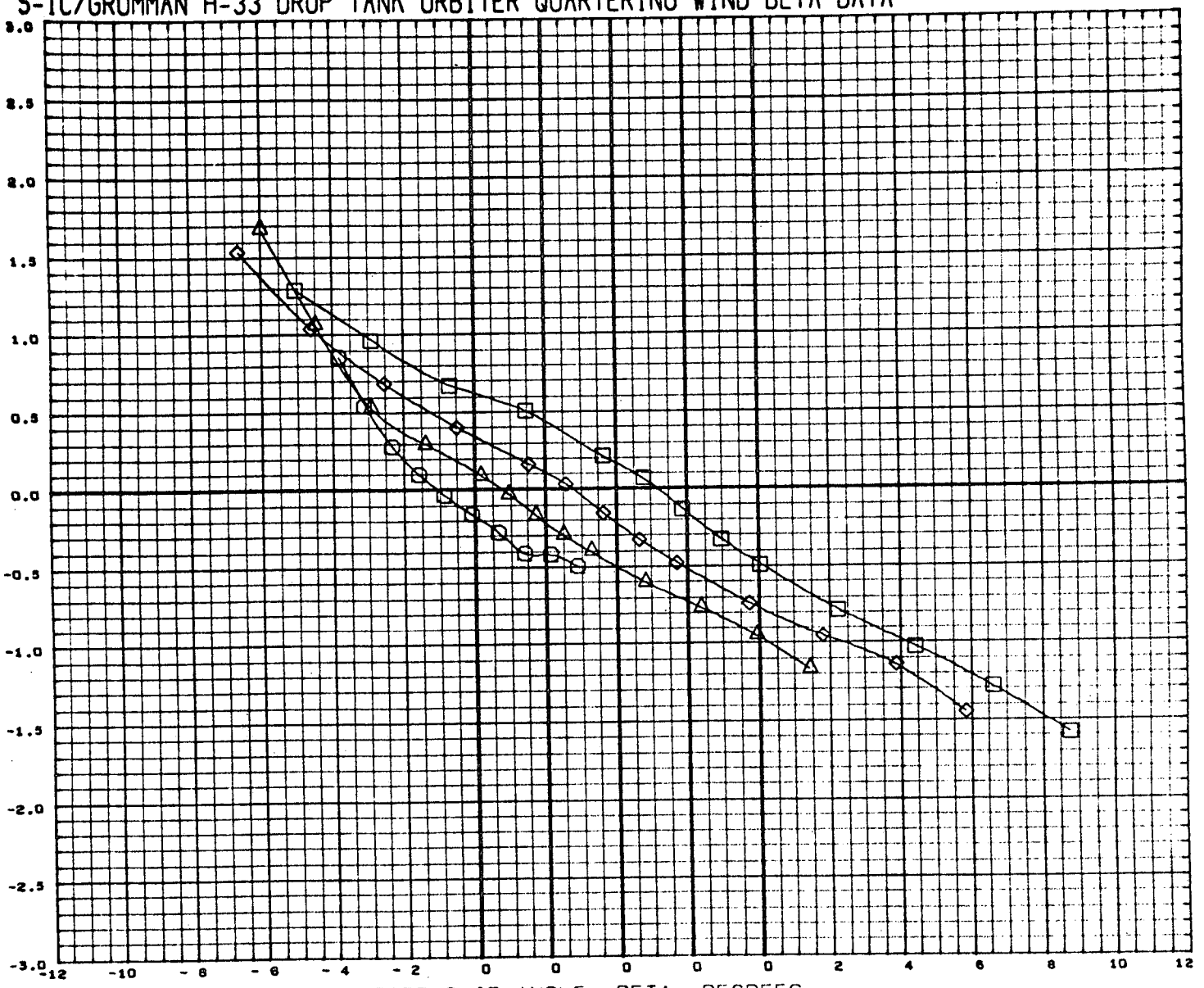
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

M502-MSFC-S1C H-33 ORBITER (ROLL) OWVTCBF (C44042) 12 MAY 72 PAGE 128

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 1.198 WNGINC 0.000

DATA SOURCE

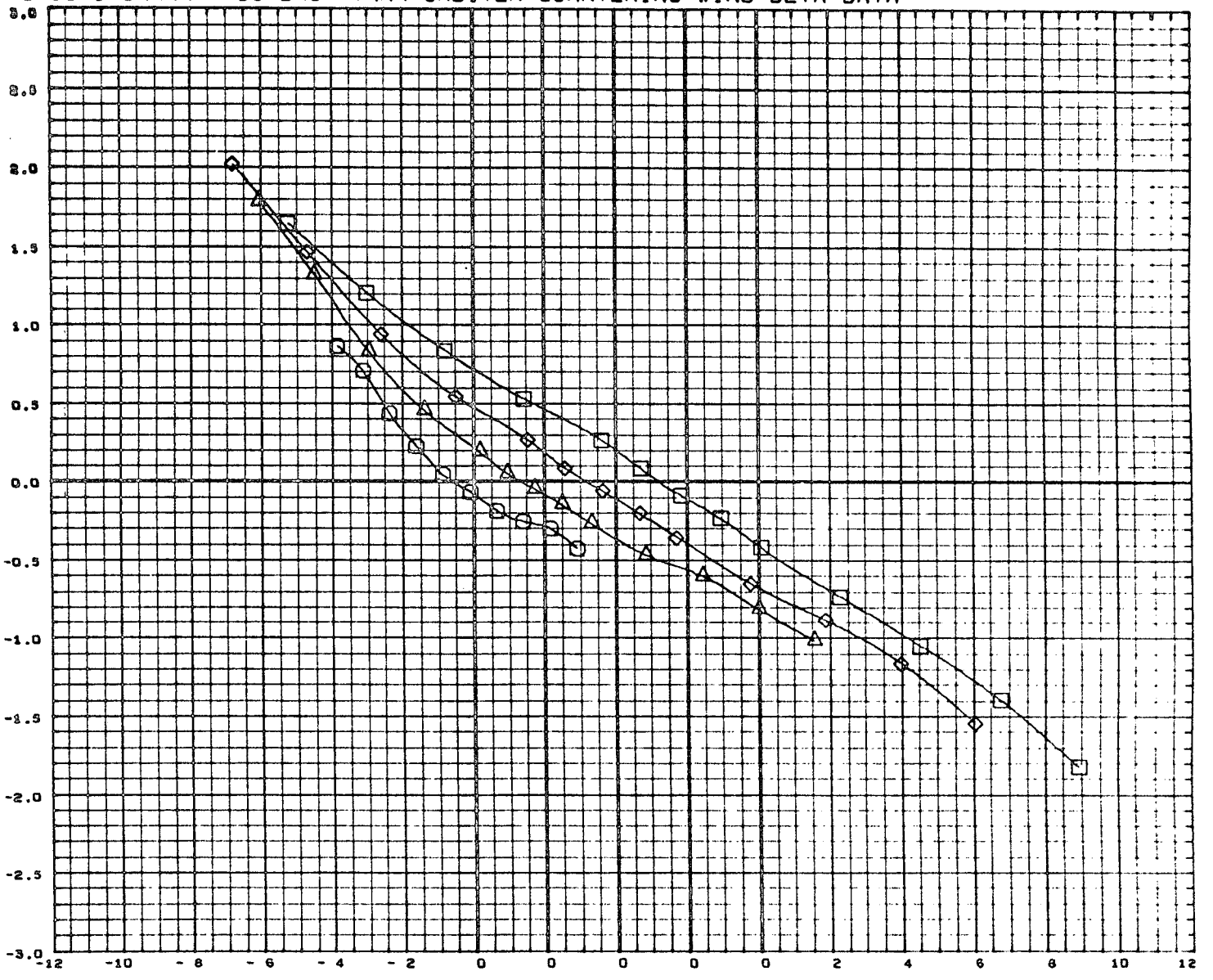
DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-IC/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
△	20.000
◇	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 1.964 WNGINC 0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

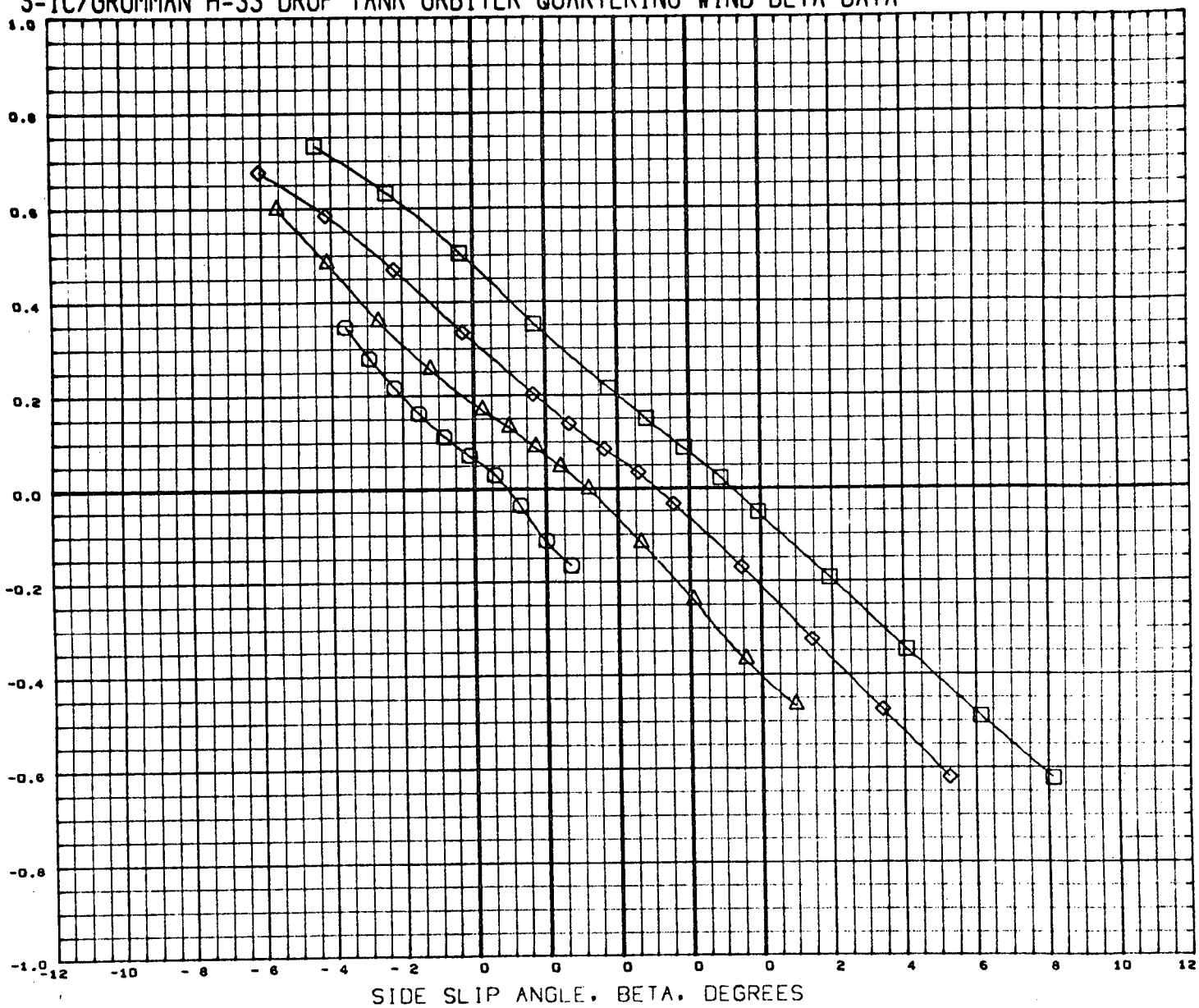
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

M502-MSFC-SIC H-33 ORBITER (ROLL) OWVTCBF (C44042) 12 MAY 72 PAGE 130

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 0.599 WNGINC 0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

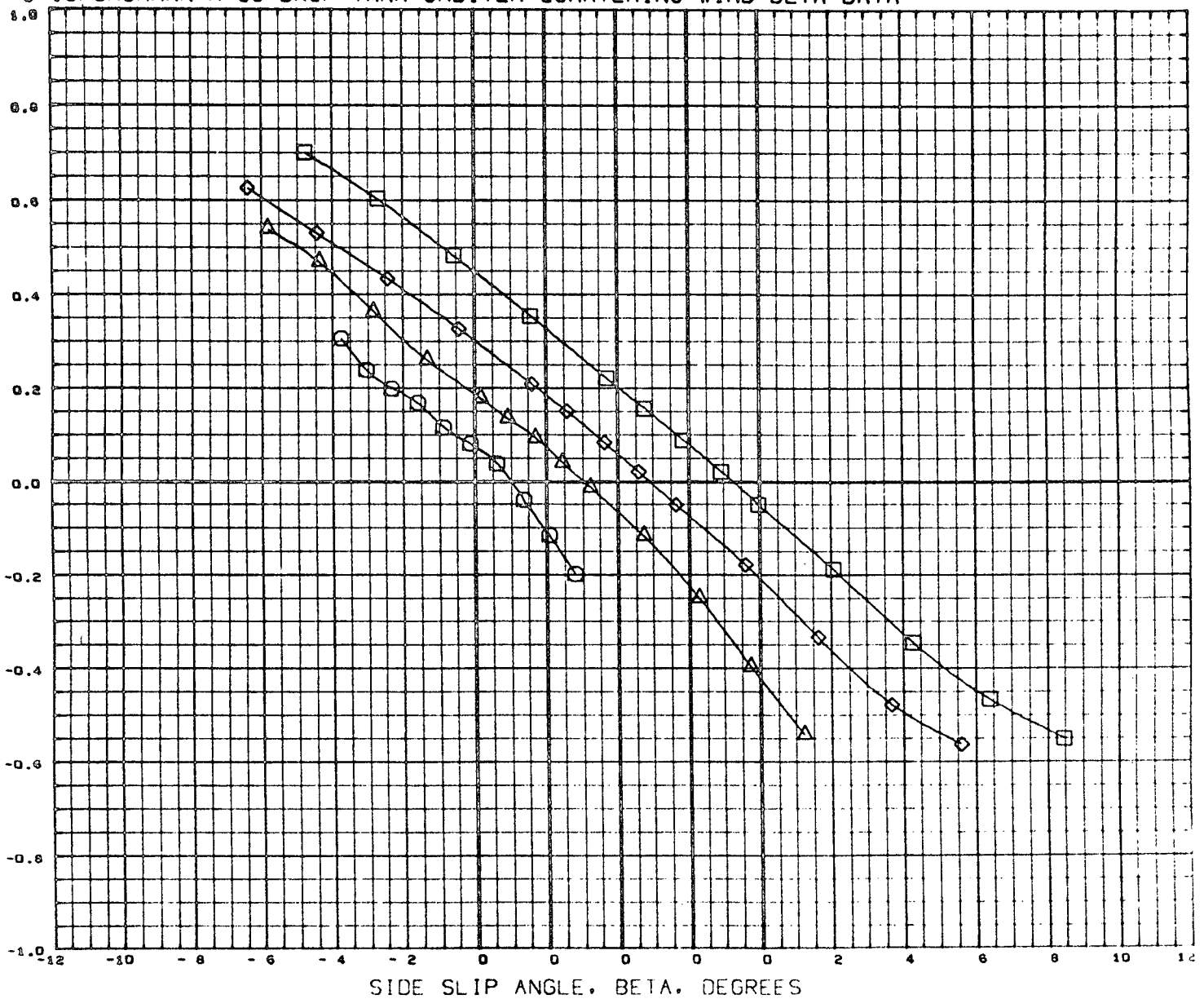
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

M502-MSFC-S1C H-33 ORBITER (ROLL) OWVTCBF (C44042) 12 MAY 72 PAGE 131

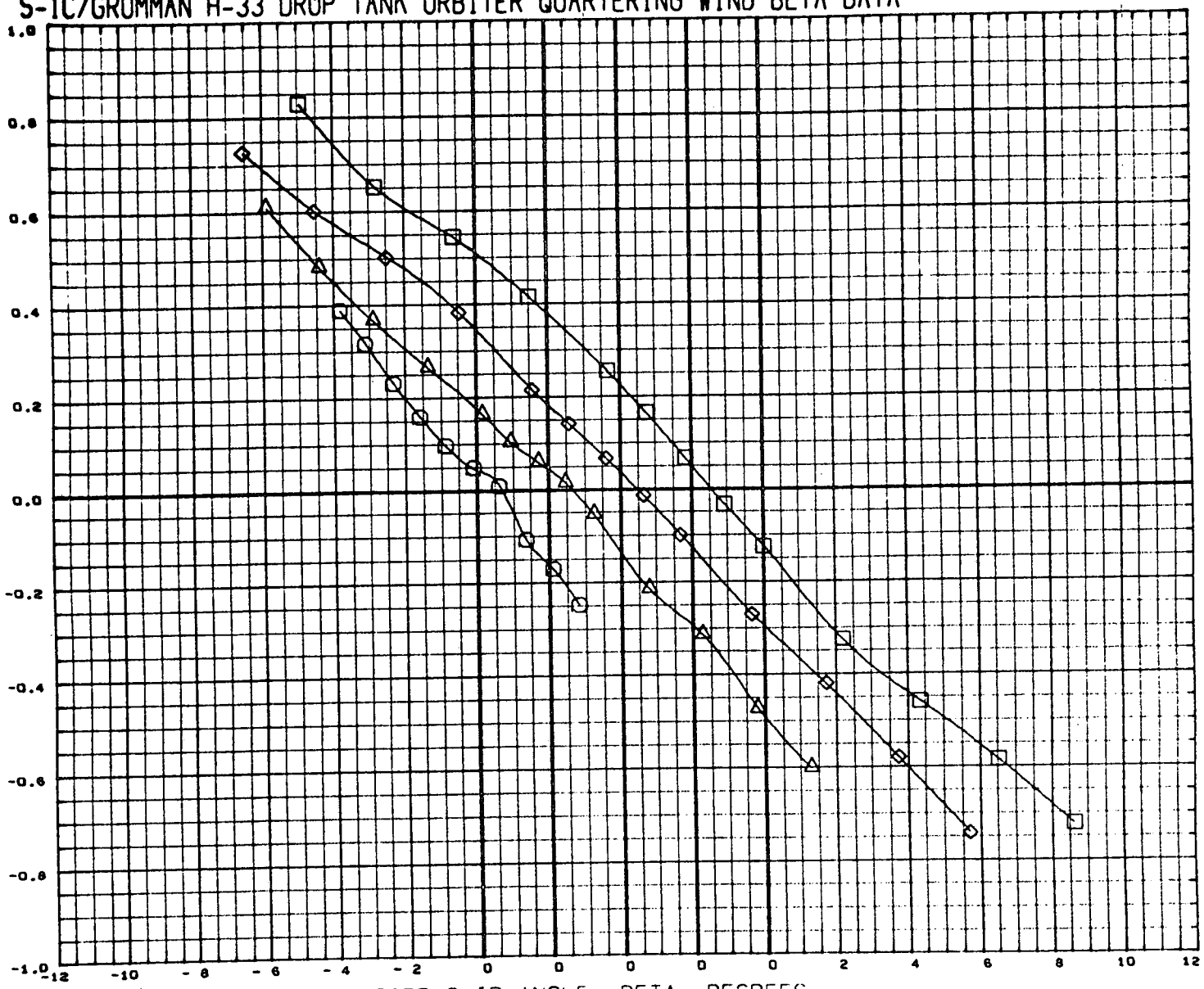
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE				REFERENCE INFORMATION		
□	20.000	MACH	0.899	WNGINC 0.000	DATASET	PHI	DATASET	PHI	SREF	1.3960	SQ.IN.
△	45.000				C44042	20.000	C44043	45.000	LREF	1.3330	IN.
◇	70.000				C44044	70.000	Z44045	90.000	BREF	1.3330	IN.
○	90.000								XMRP	5.3990	IN.
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
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△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 1.001 WNGINC 0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

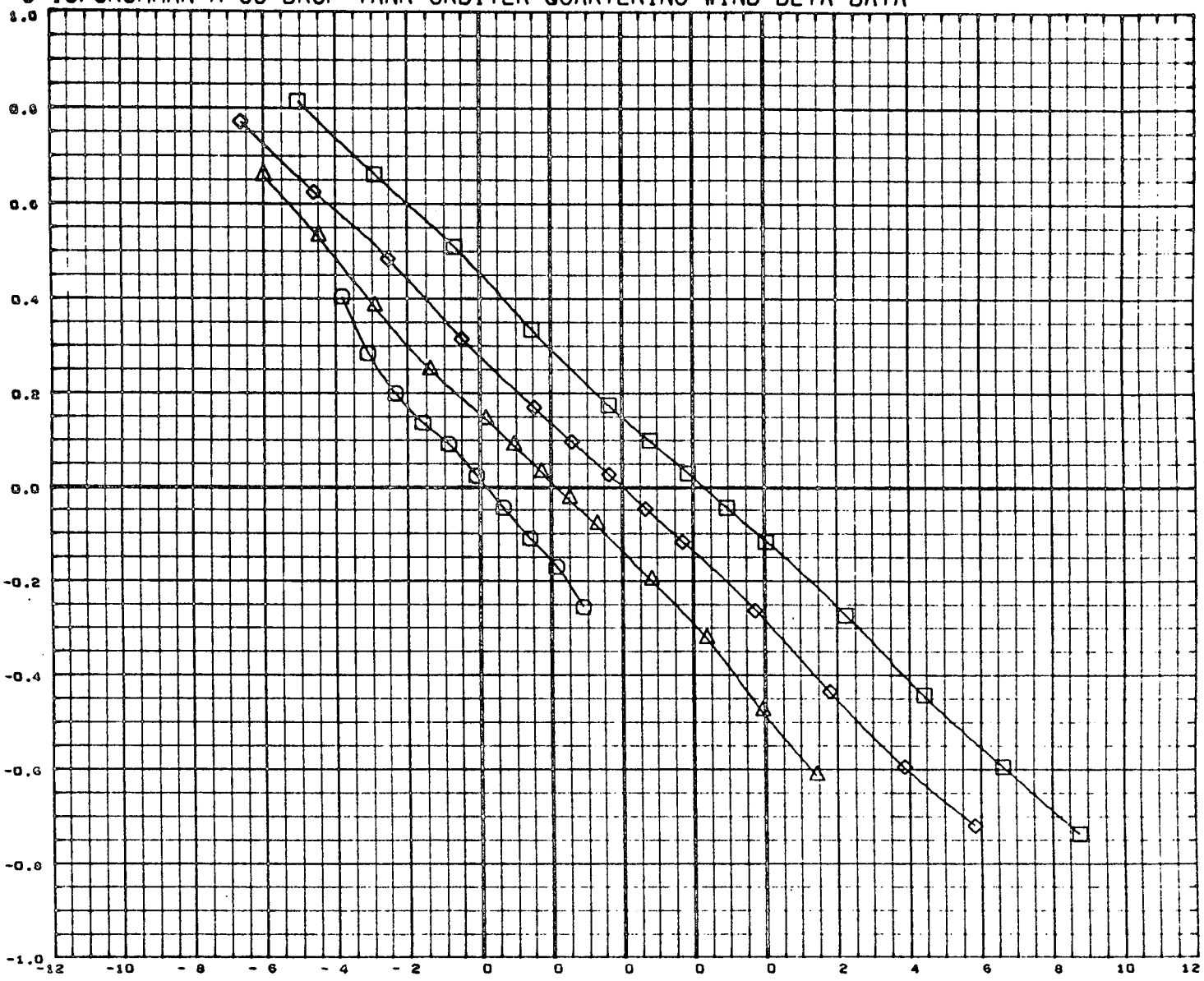
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

M502-MSFC-SIC H-33 ORBITER (ROLL) OWVTCBF (C44042) 12 MAY 72 PAGE 133

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
X	20.000
◇	45.000
△	70.000
□	90.000

PARAMETRIC VALUES: MACH 1.198 WNGINC 0.000

DATA SOURCE			
DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

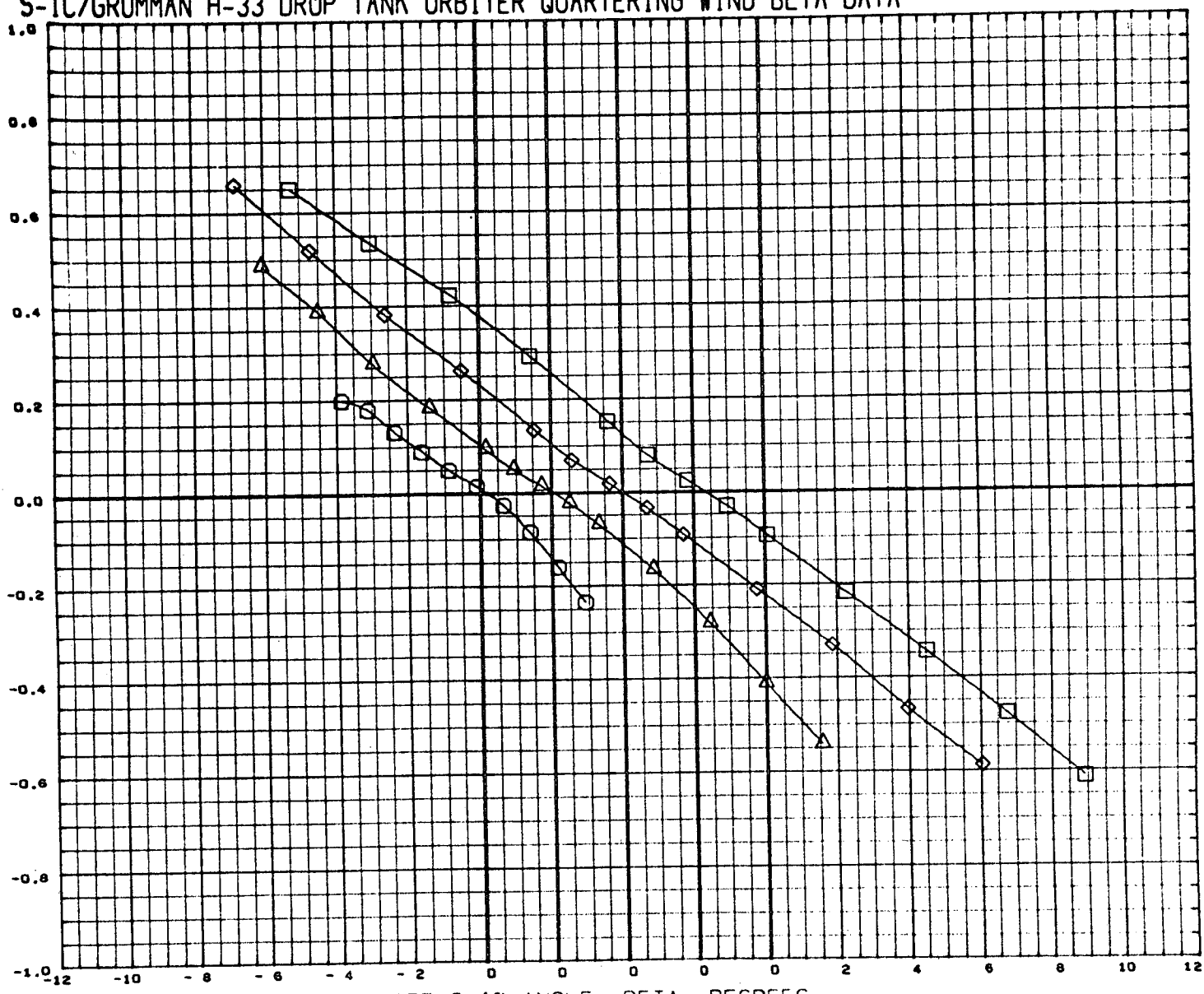
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

M502-MSFC-S1C H-33 ORBITER (ROLL) OWVTCBF (C44042) 12 MAY 72 PAGE 134

C-4

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 1.964 WNGINC 0.000

DATA SOURCE

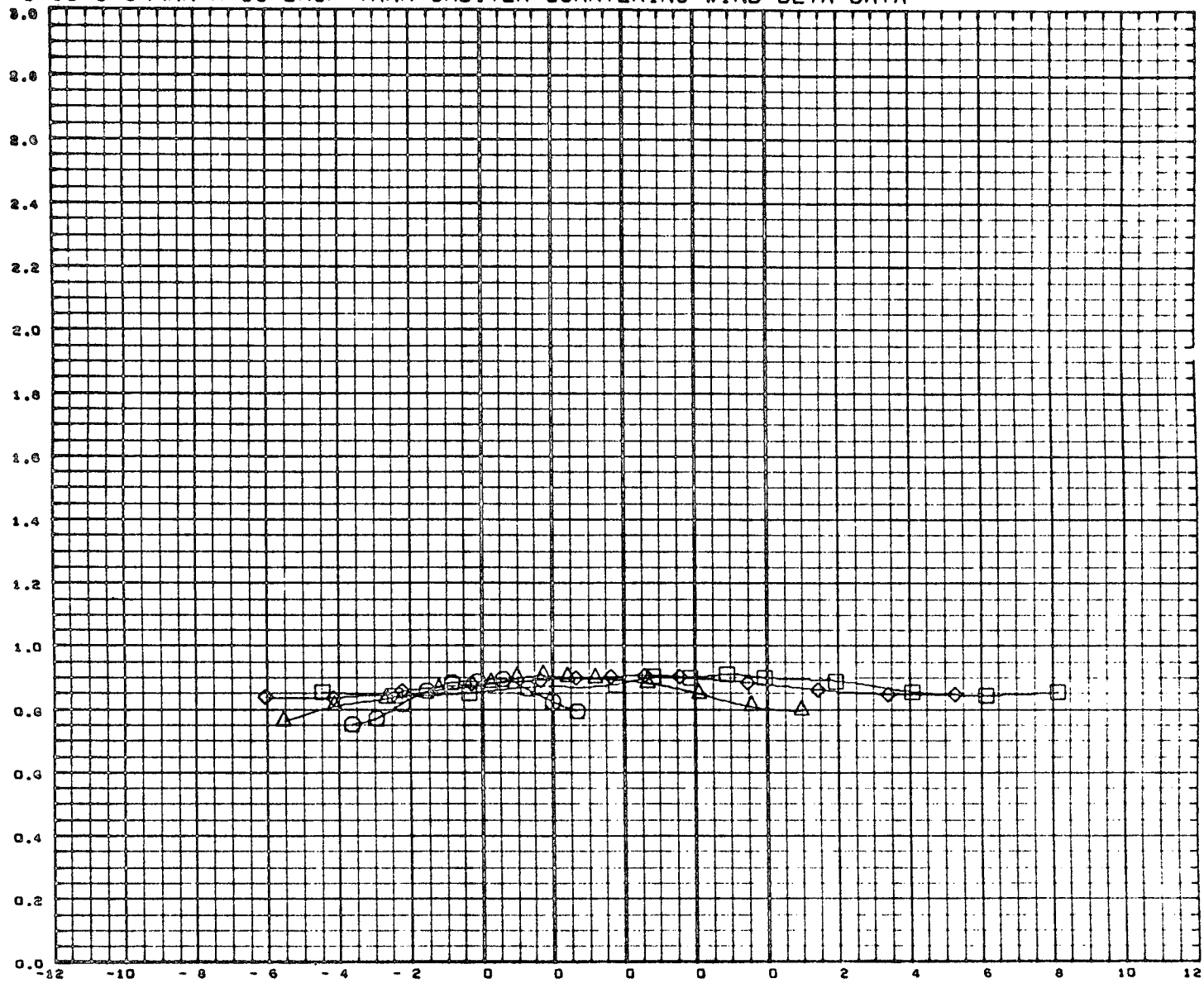
DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
△	20.000
◇	45.000
○	70.000
□	90.000

PARAMETRIC VALUES

MACH 0.599 WNGINC 0.000

DATA SOURCE

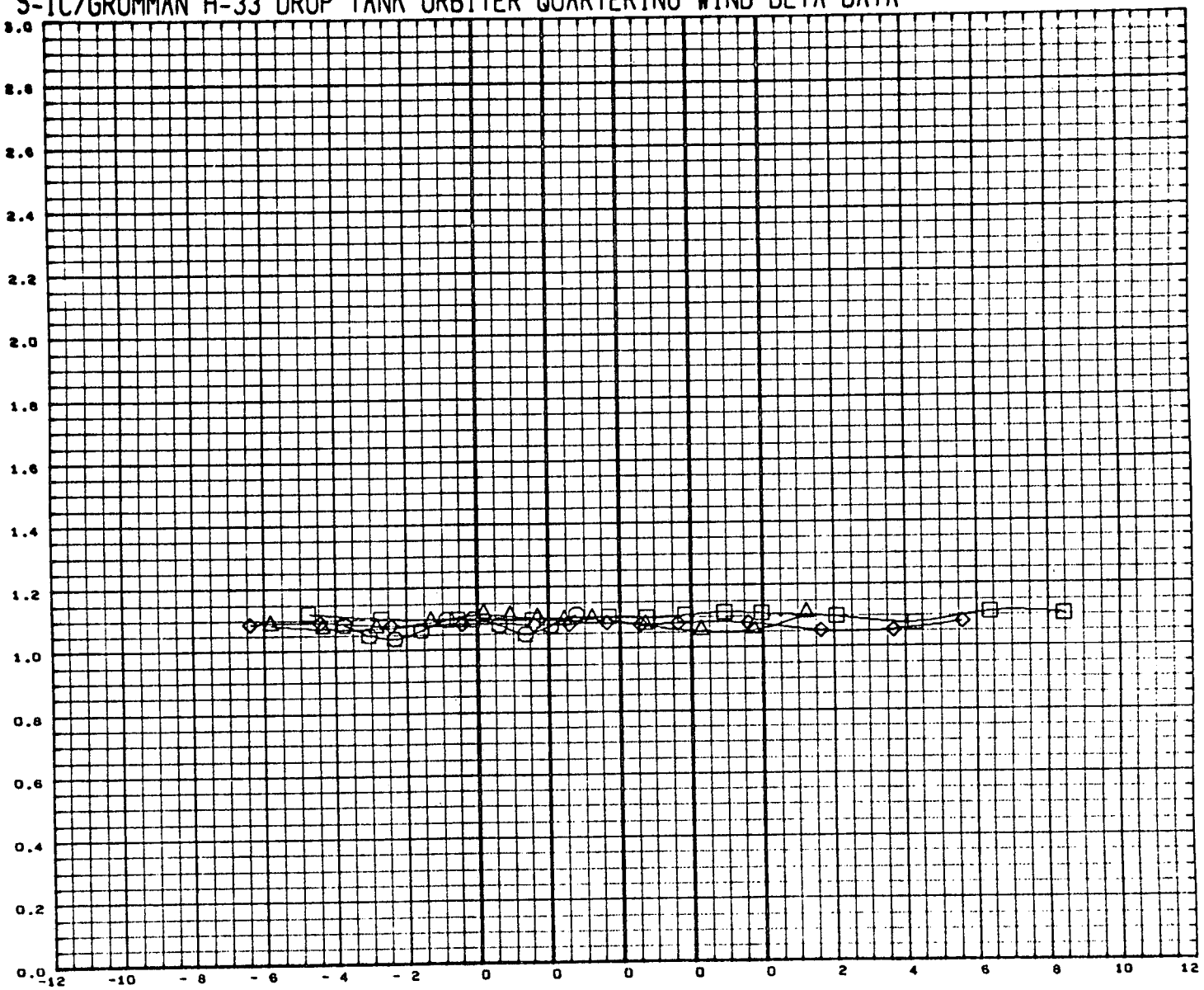
DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 0.899 WNGINC 0.000

DATA SOURCE

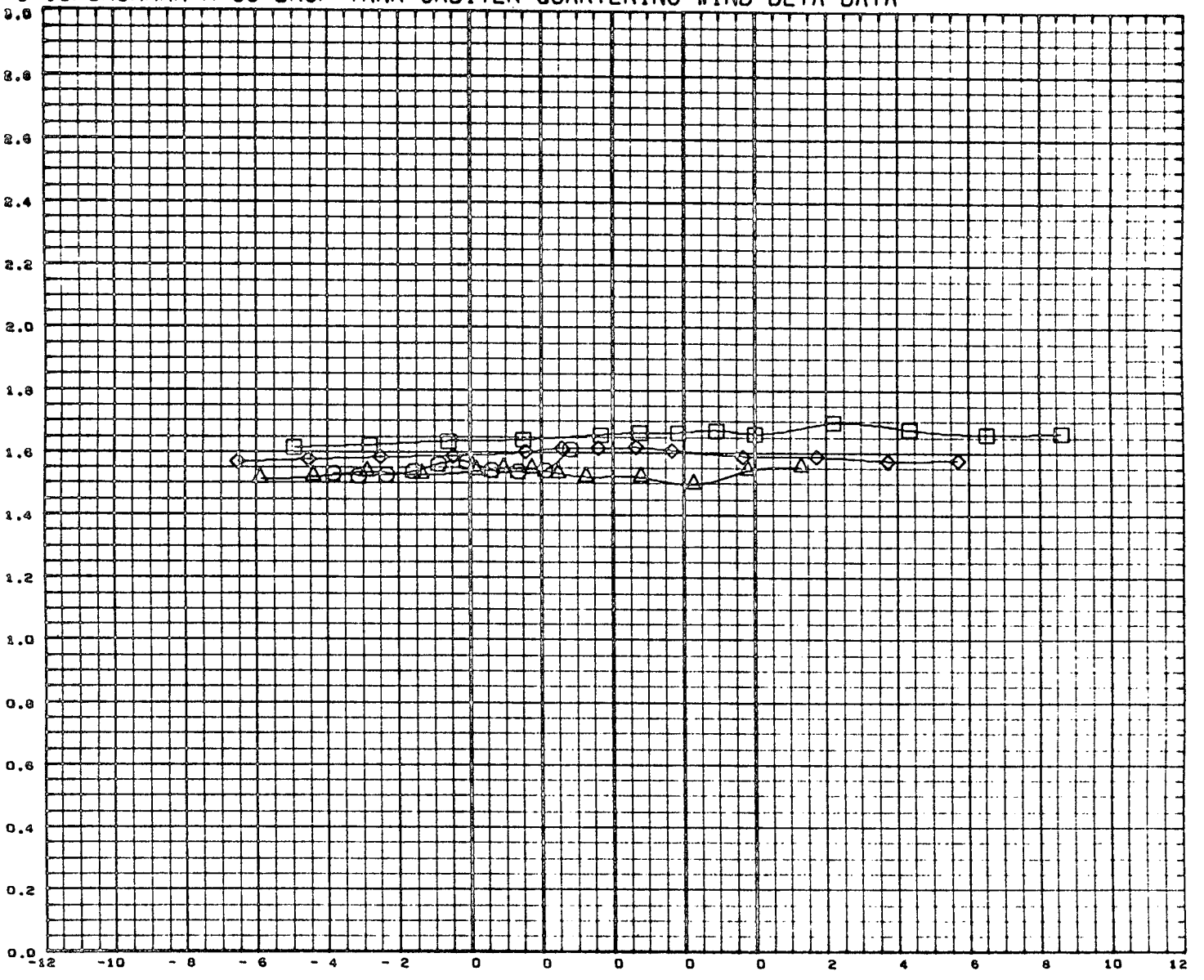
DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE				REFERENCE INFORMATION		
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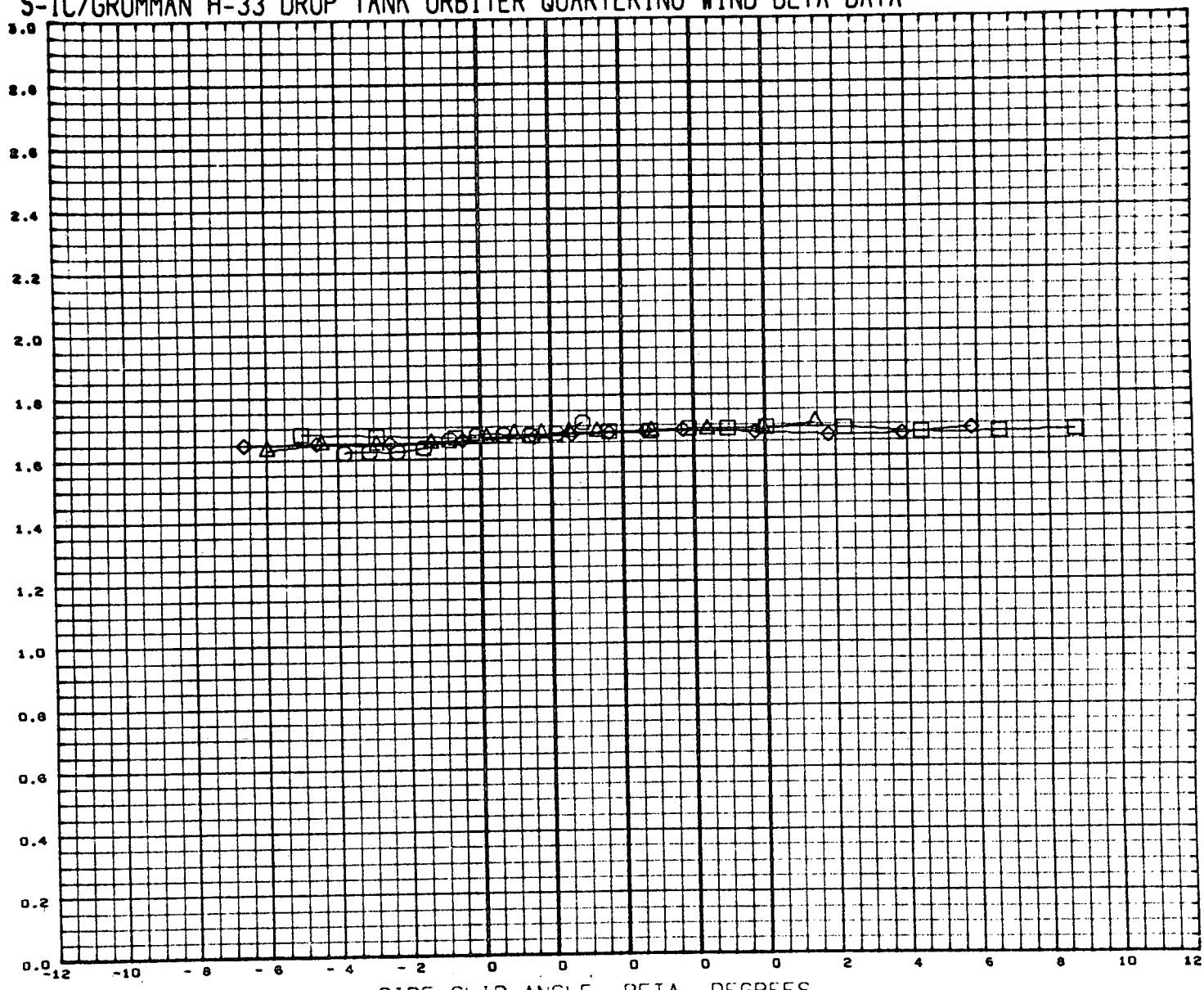
◇	70.000				C44044	70.000	Z44045	90.000	BREF	1.3330	IN.
□	90.000								XMRP	5.3990	IN.
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCGC

S-IC/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 1.198 WNGINC 0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

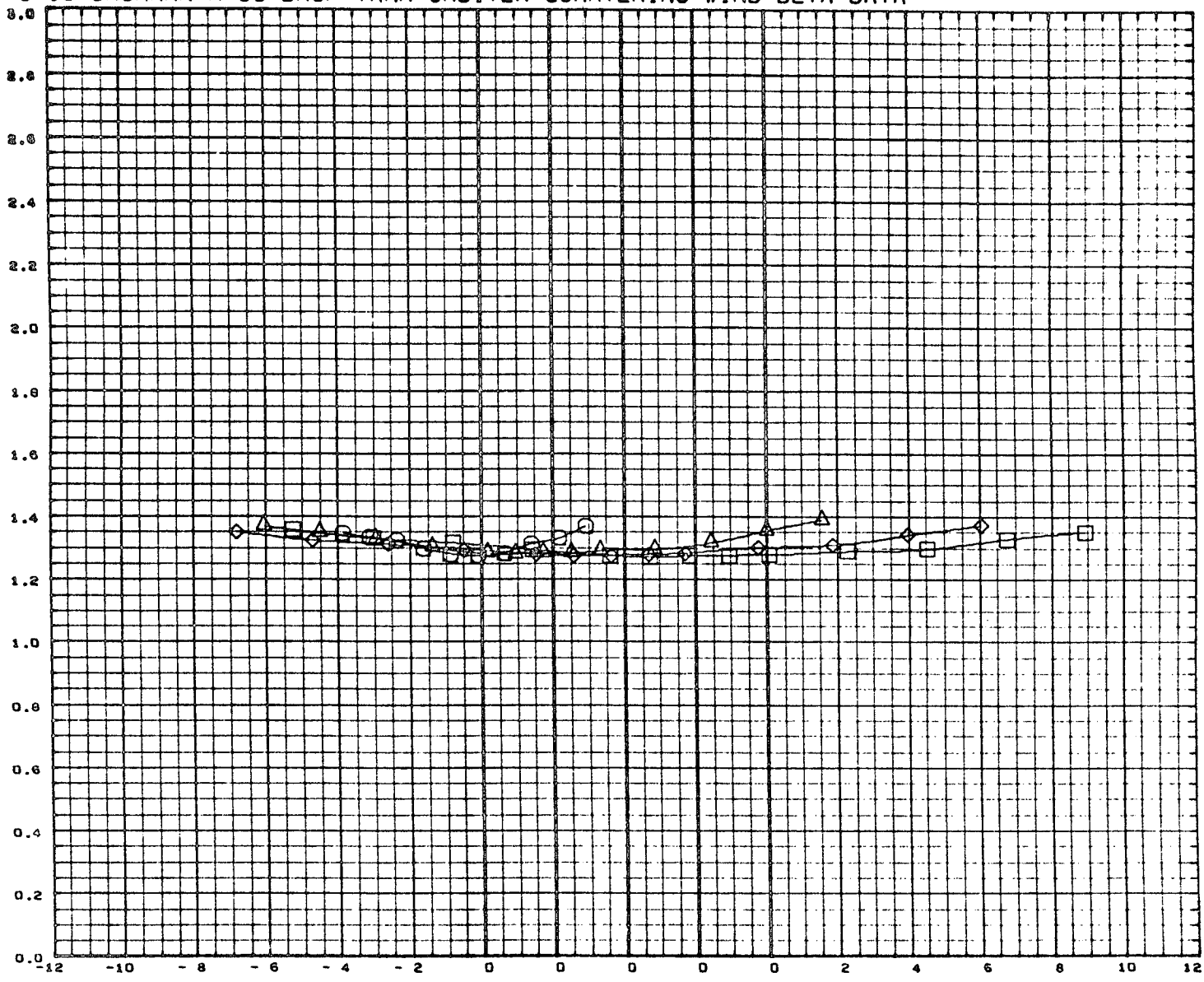
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

M502-MSFC-SIC H-33 ORBITER (ROLL) OWVTCBF (C44042) 12 MAY 72 PAGE 139

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES: MACH 1.964 WNGINC 0.000

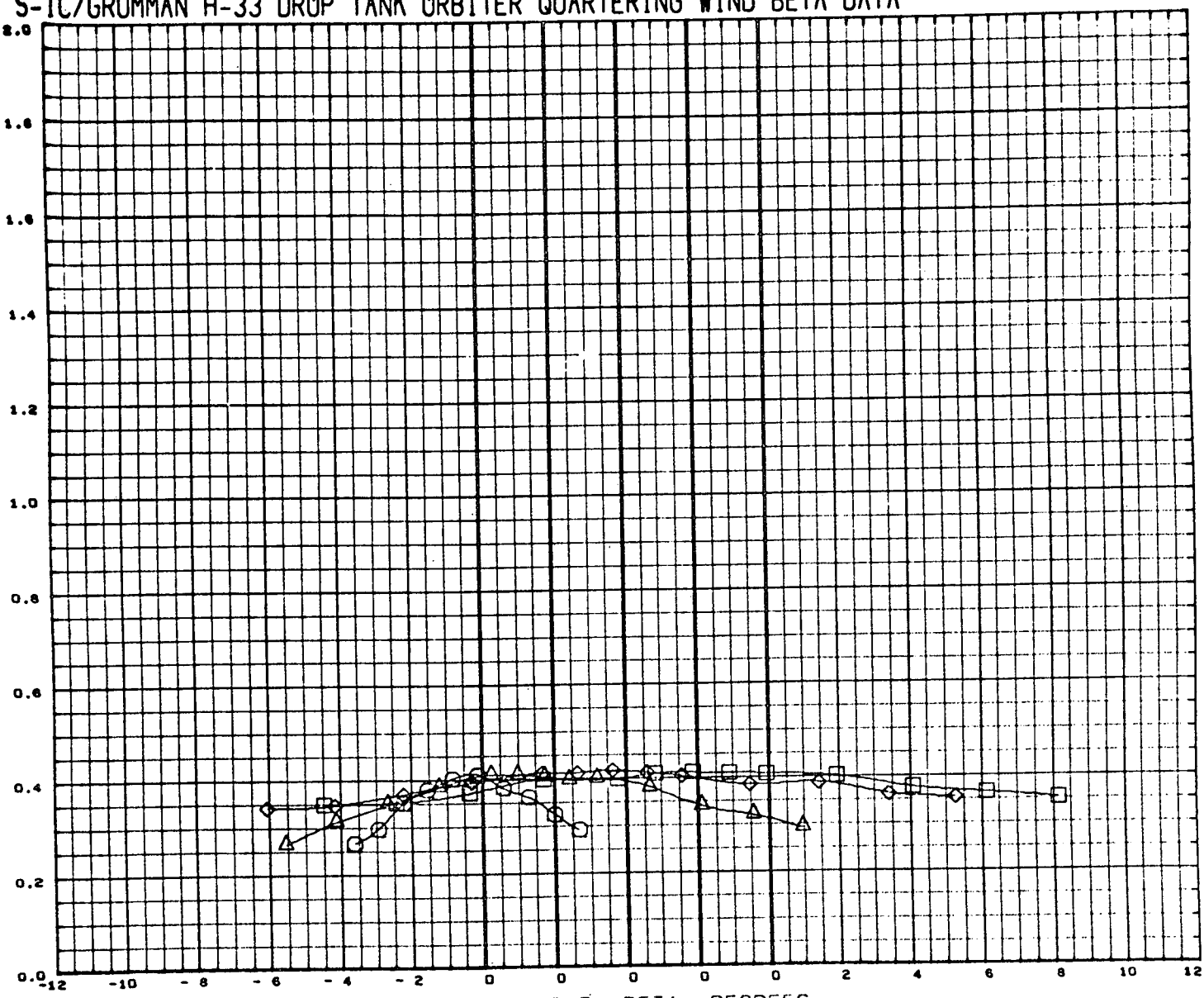
DATA SOURCE			
DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 0.599 WNGINC 0.000

DATA SOURCE

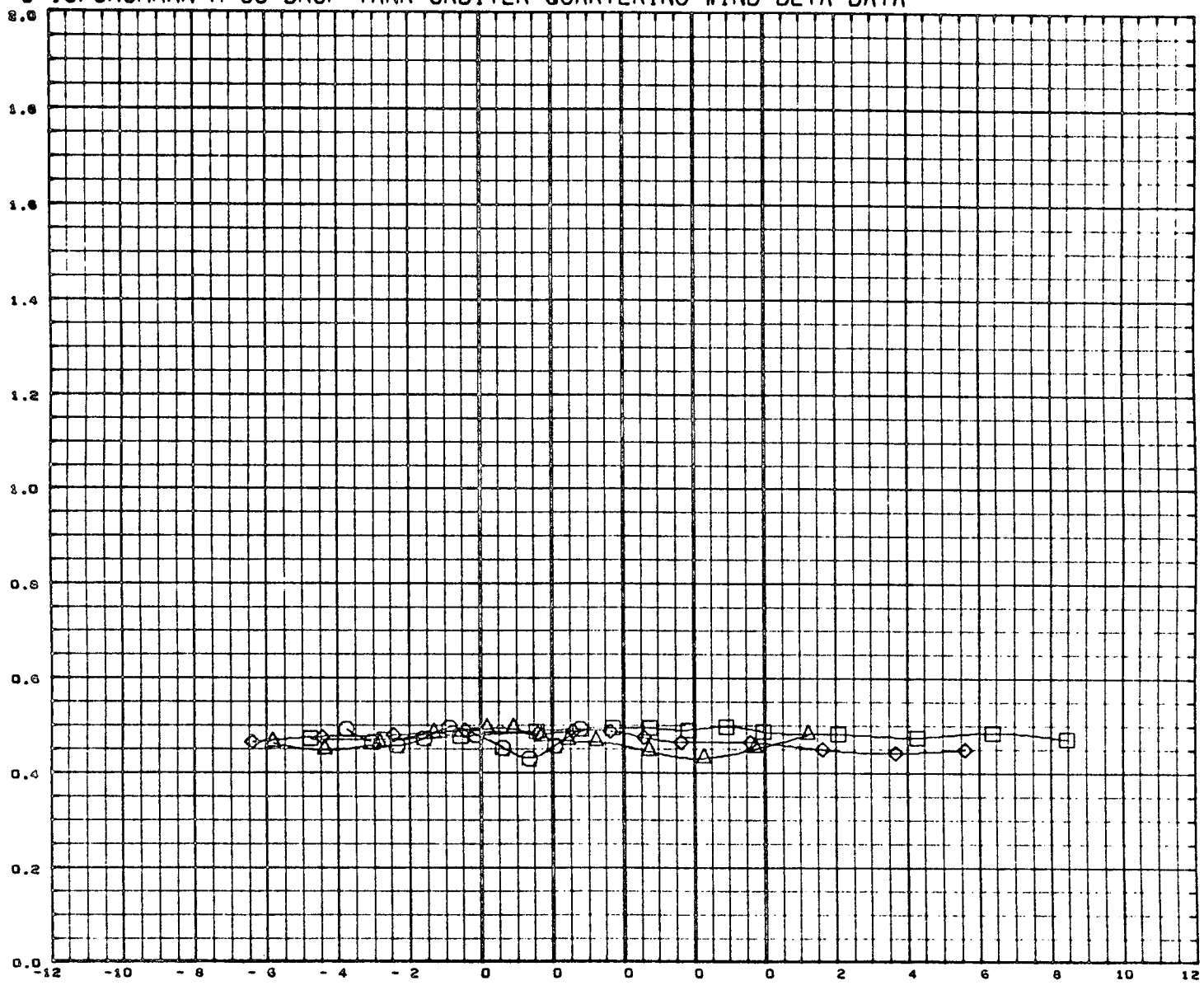
DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 0.899 WNGINC 0.000

DATA SOURCE

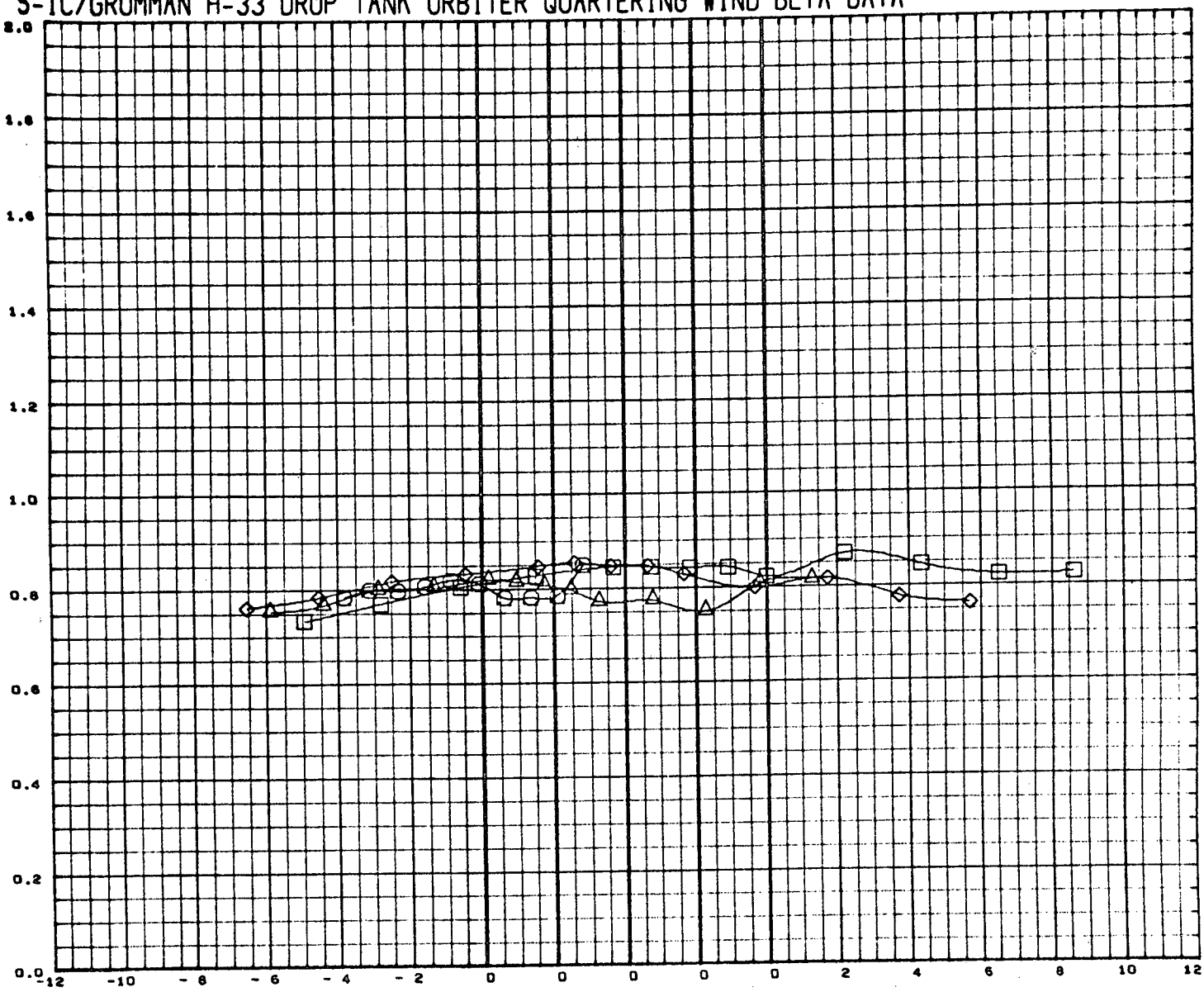
DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
□	20.000
◇	45.000
△	70.000
○	90.000

PARAMETRIC VALUES

MACH 1.001 WNGINC 0.000

DATA SOURCE

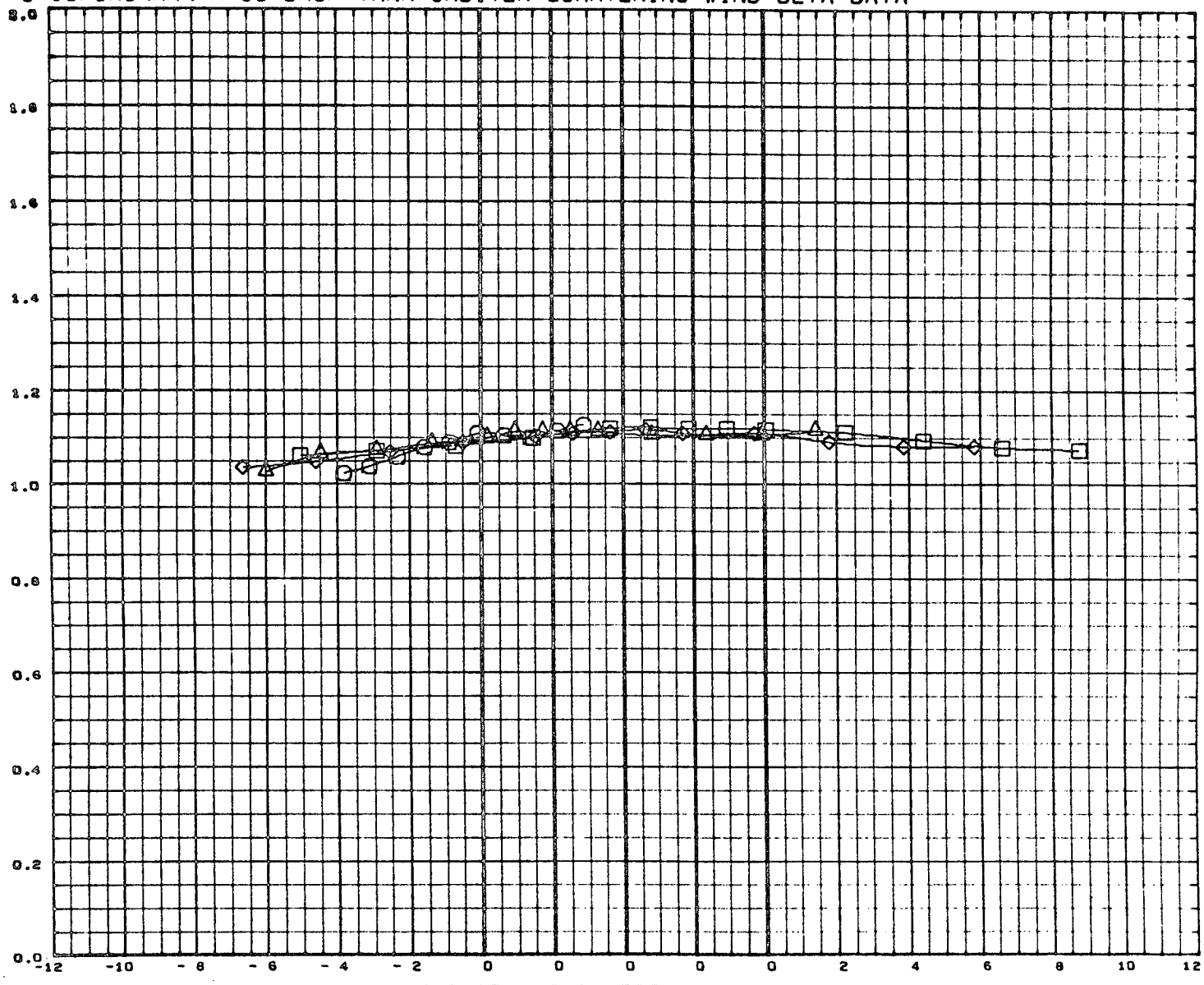
DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
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△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES: MACH 1.198 WNGINC 0.000

DATA SOURCE

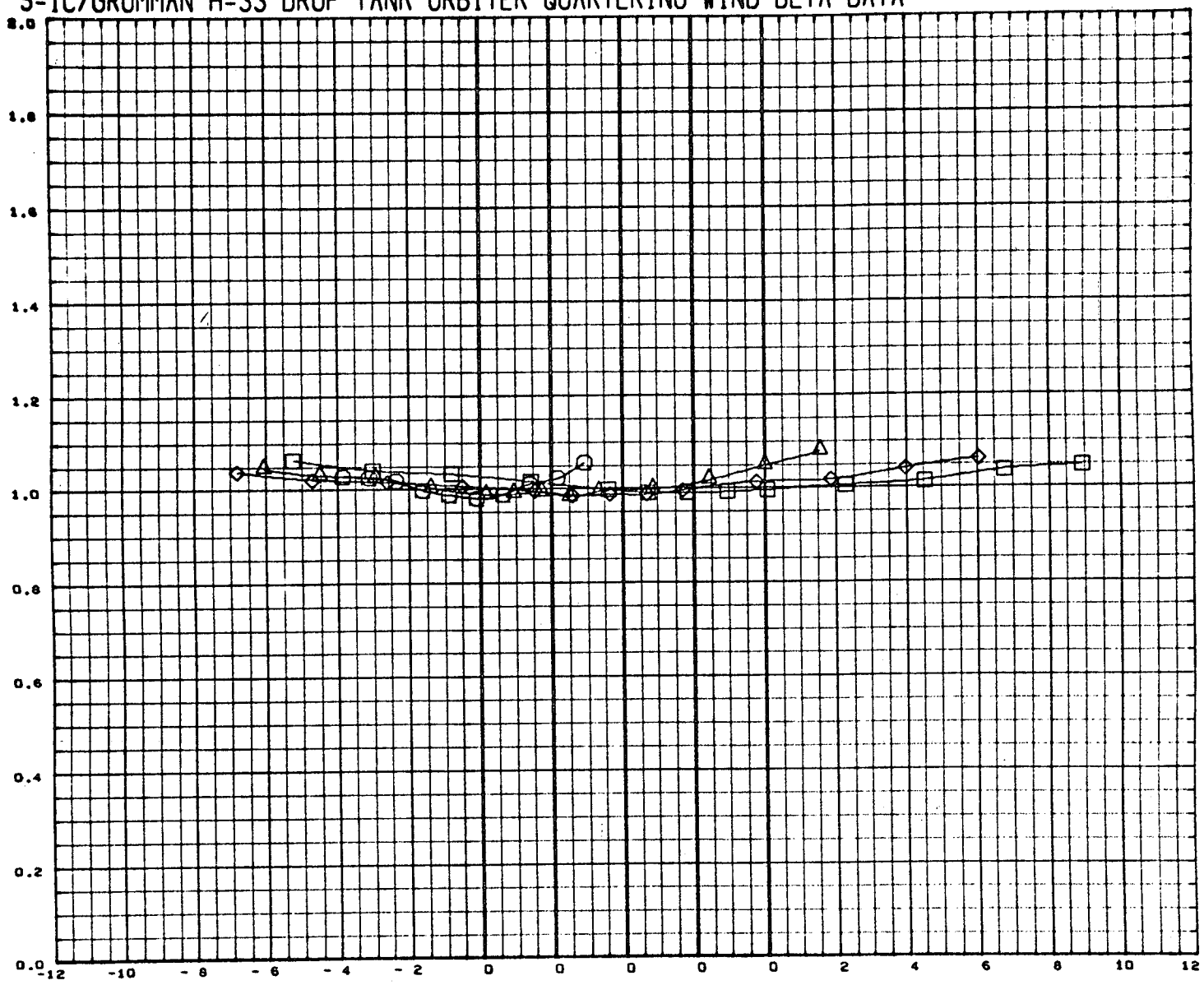
DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
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△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 1.964 WNGINC 0.000

DATA SOURCE

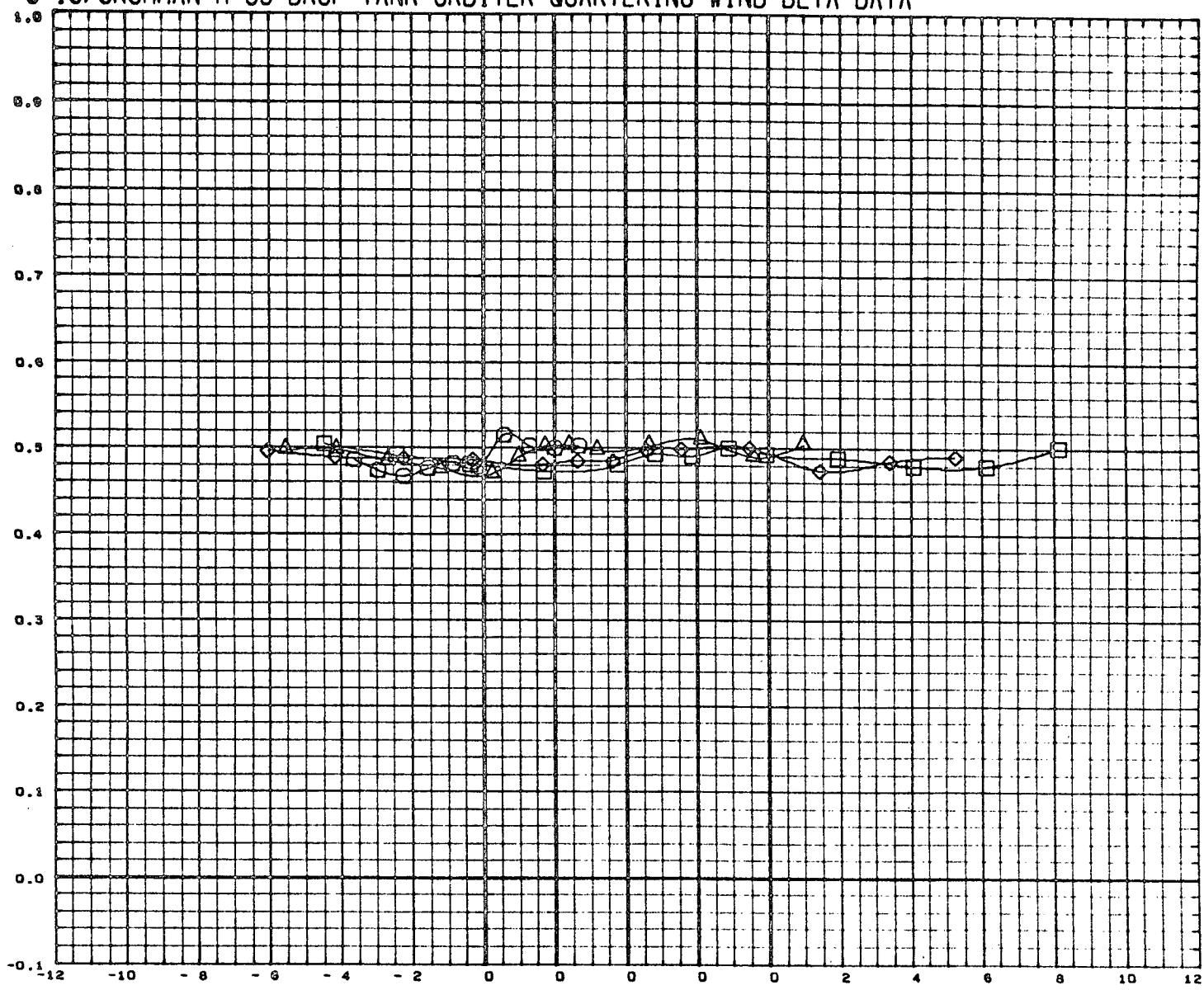
DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
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△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 0.599 WNGINC 0.000

DATA SOURCE

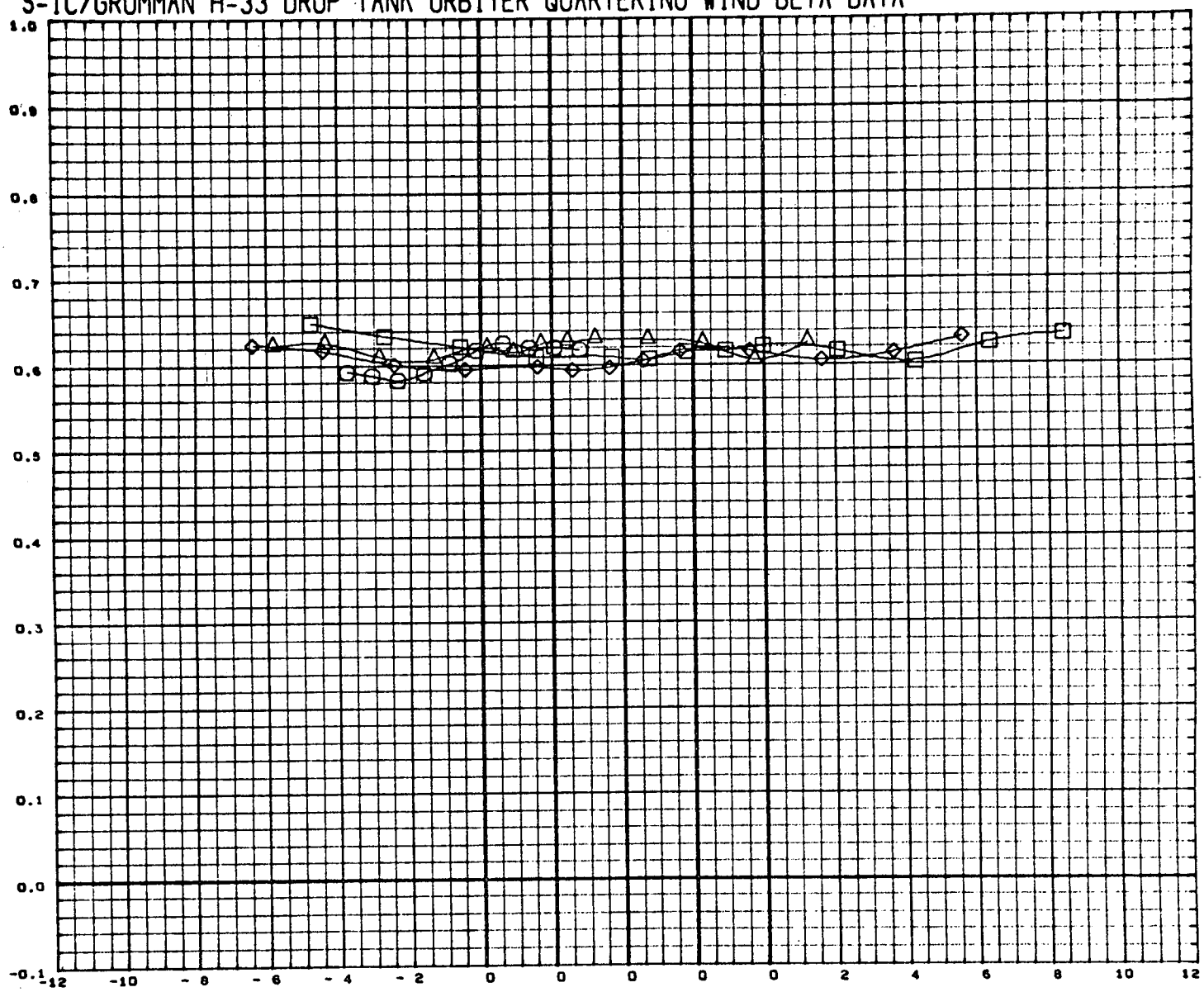
DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 0.899 WNGINC 0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

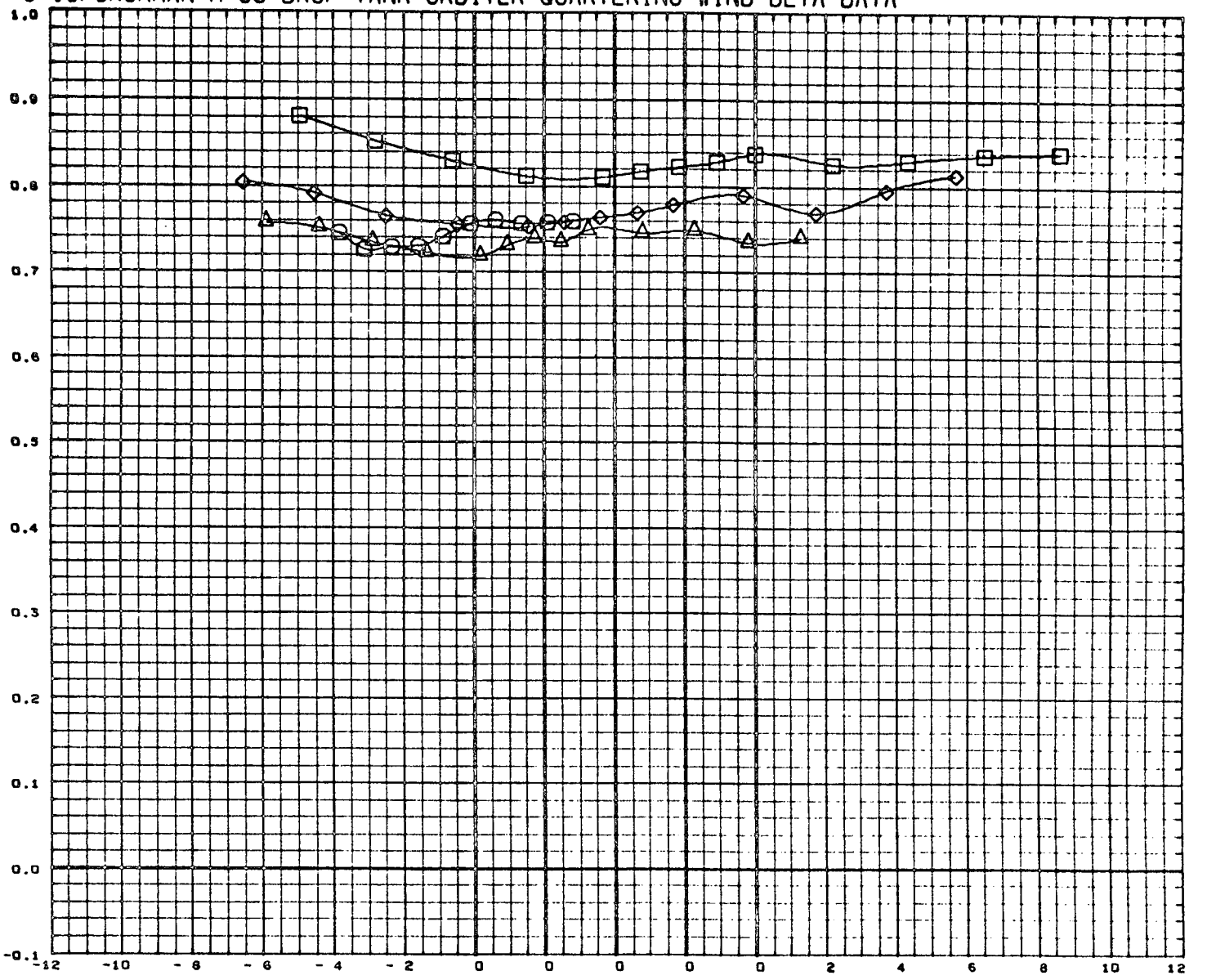
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

M502 MSFC-S1C H-33 ORBITER (ROLL) OWVTCBF (C44042) 12 MAY 72 PAGE 147

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
X	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES: MACH 1.001 WNGINC 0.000

DATA SOURCE

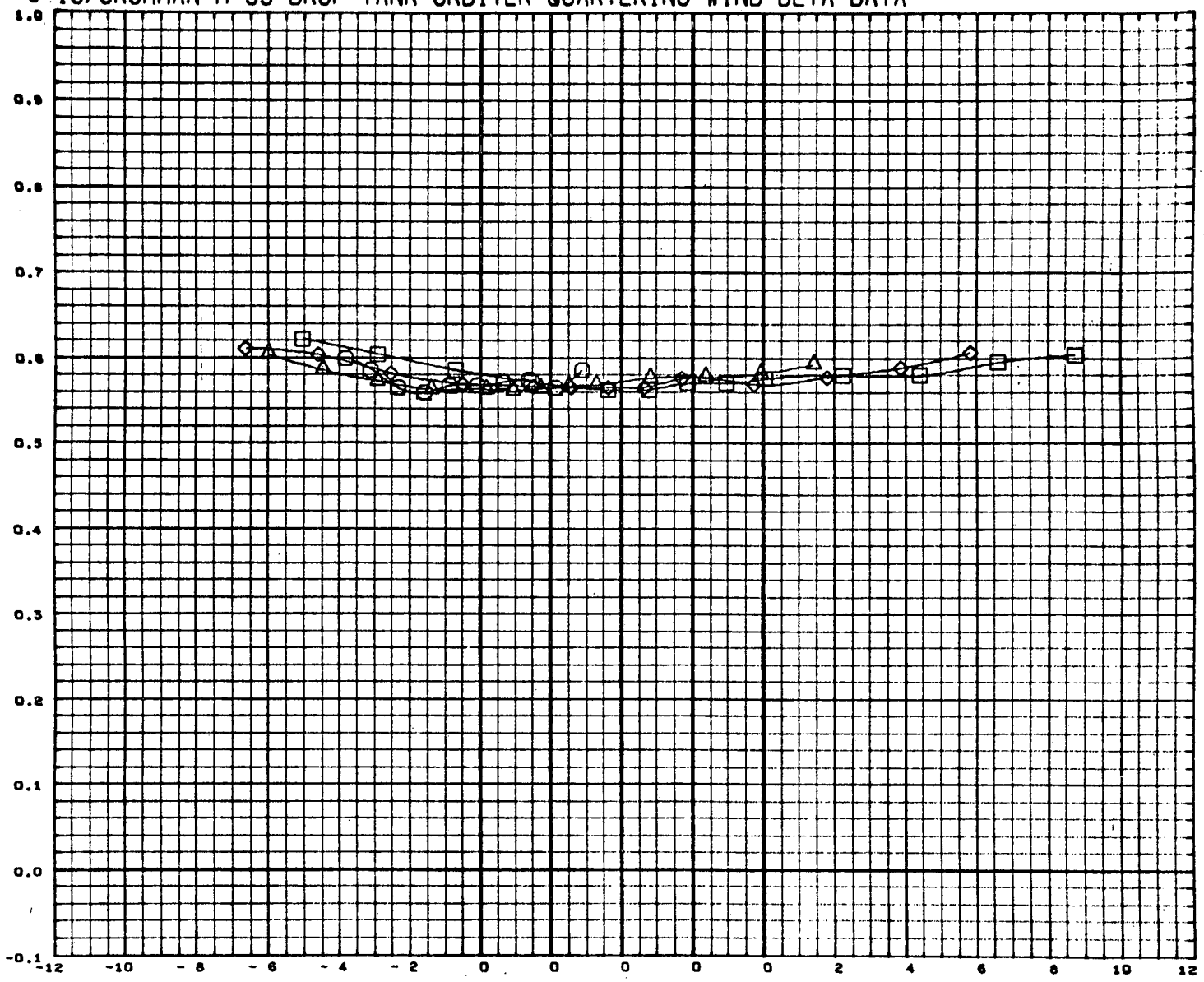
DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 1.198 WNGINC 0.000

DATA SOURCE

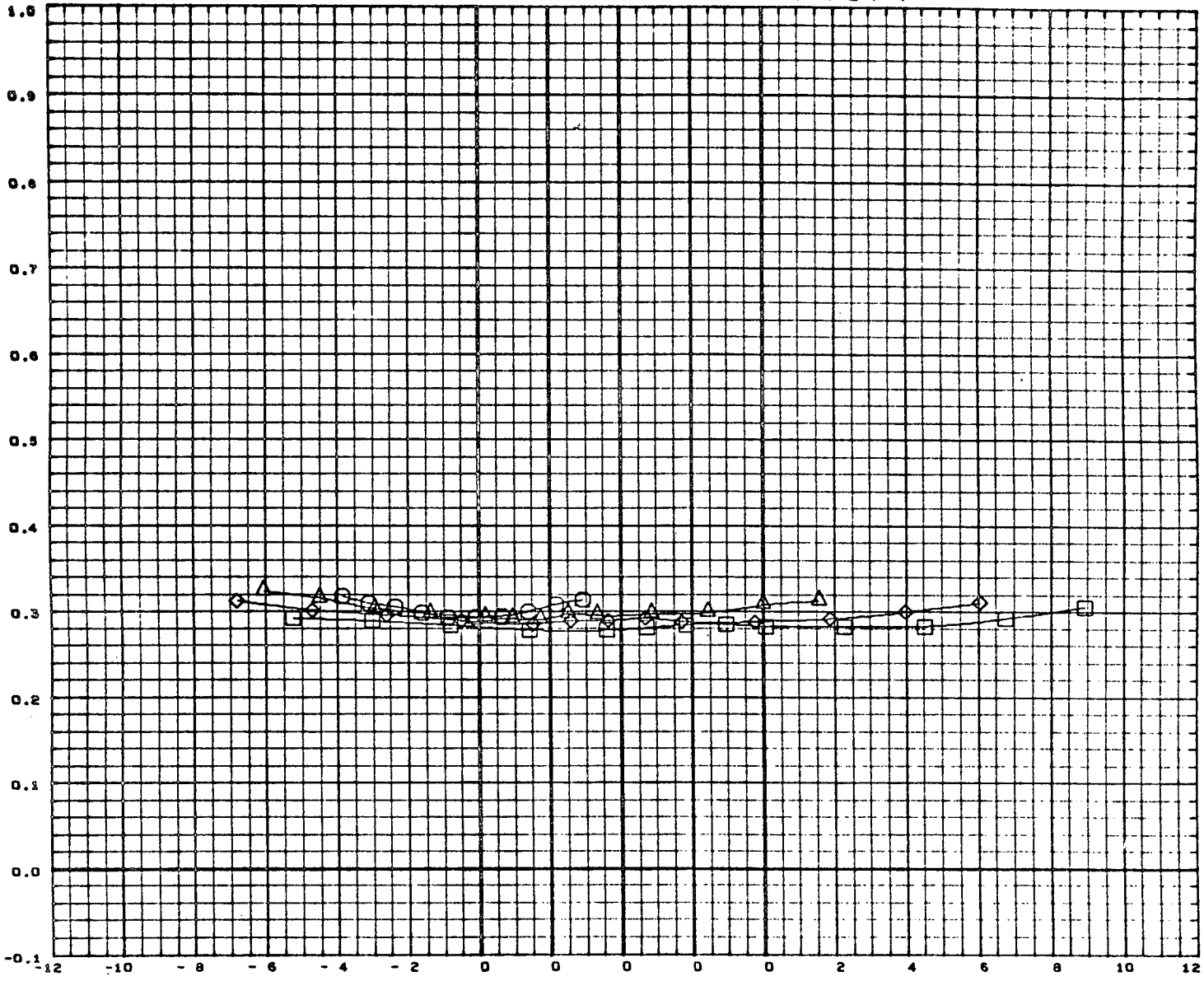
DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

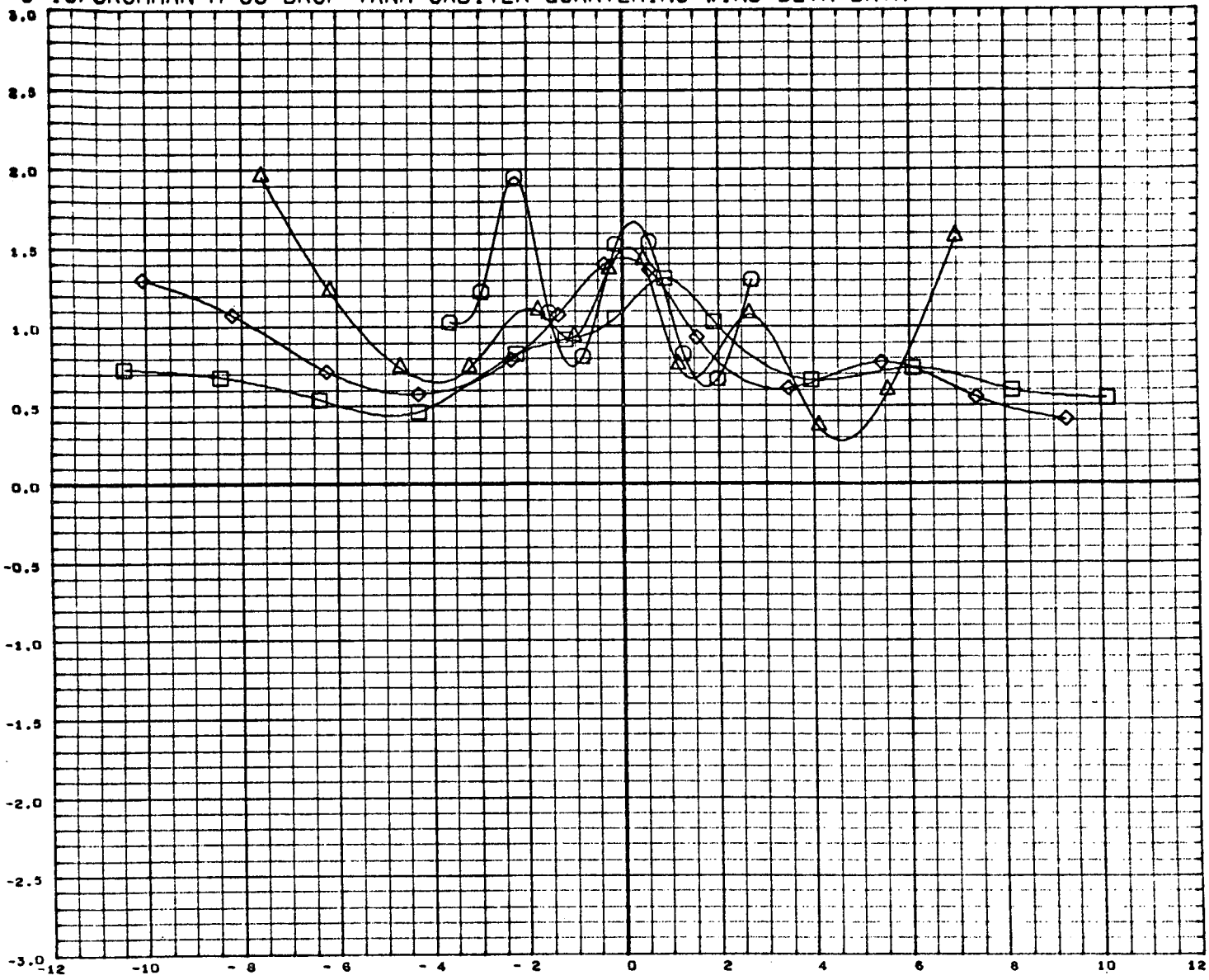
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE				REFERENCE INFORMATION		
○	20.000	MACH	1.964	WNGINC 0.000	DATASET	PHI	DATASET	PHI	SREF	1.3960	SQ.IN.
△	45.000				C44042	20.000	C44043	45.000	LREF	1.3330	IN.
◇	70.000				C44044	70.000	244045	90.000	BREF	1.3330	IN.
□	90.000								XMRP	5.3990	IN.
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 0.599 WNGINC 0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

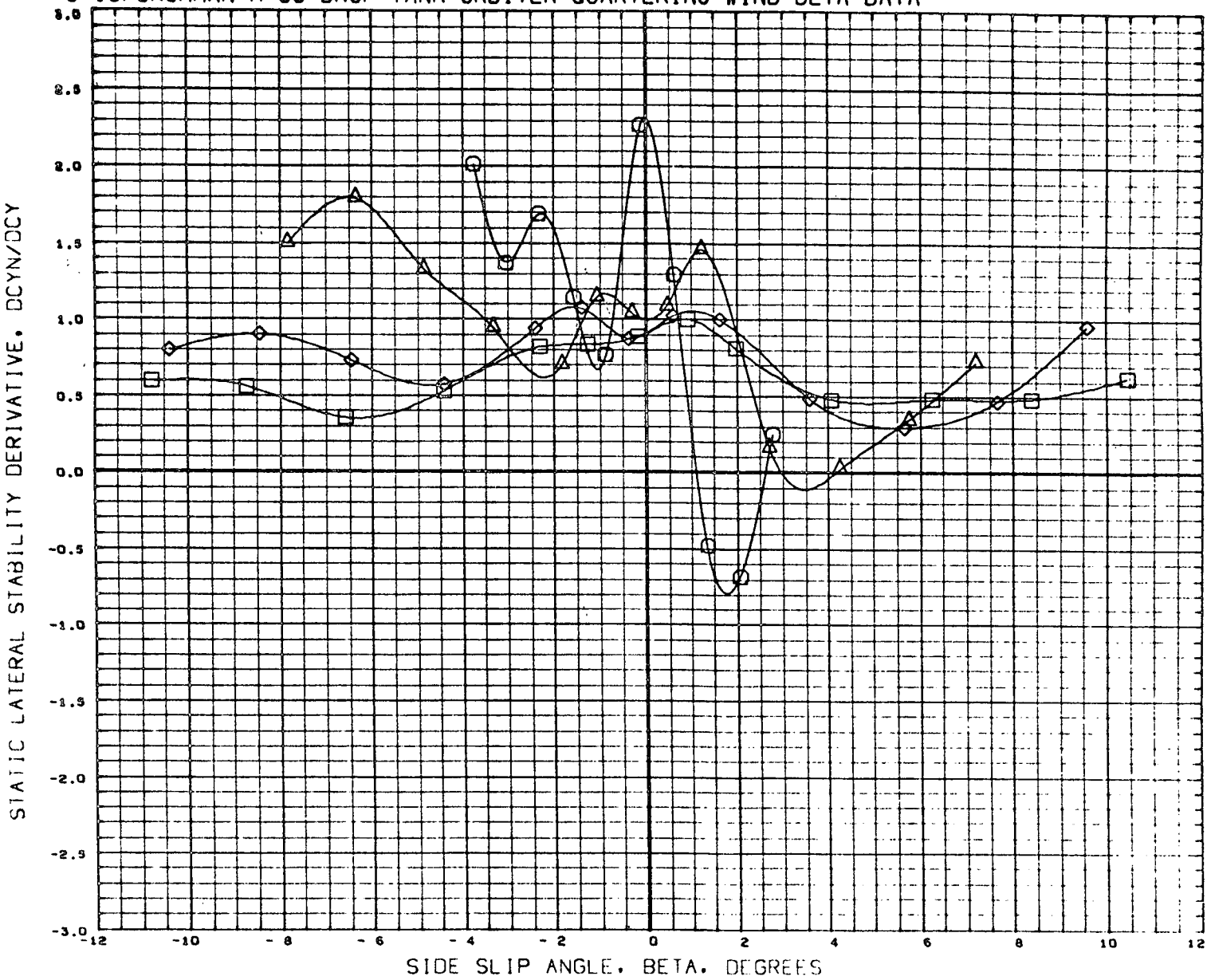
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

M502 MSFC-S1C H-33 ORBITER (ROLL) OWVTCBF (C44042) 12 MAY 72 PAGE 151

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 0.899 WNGINC 0.000

DATA SOURCE

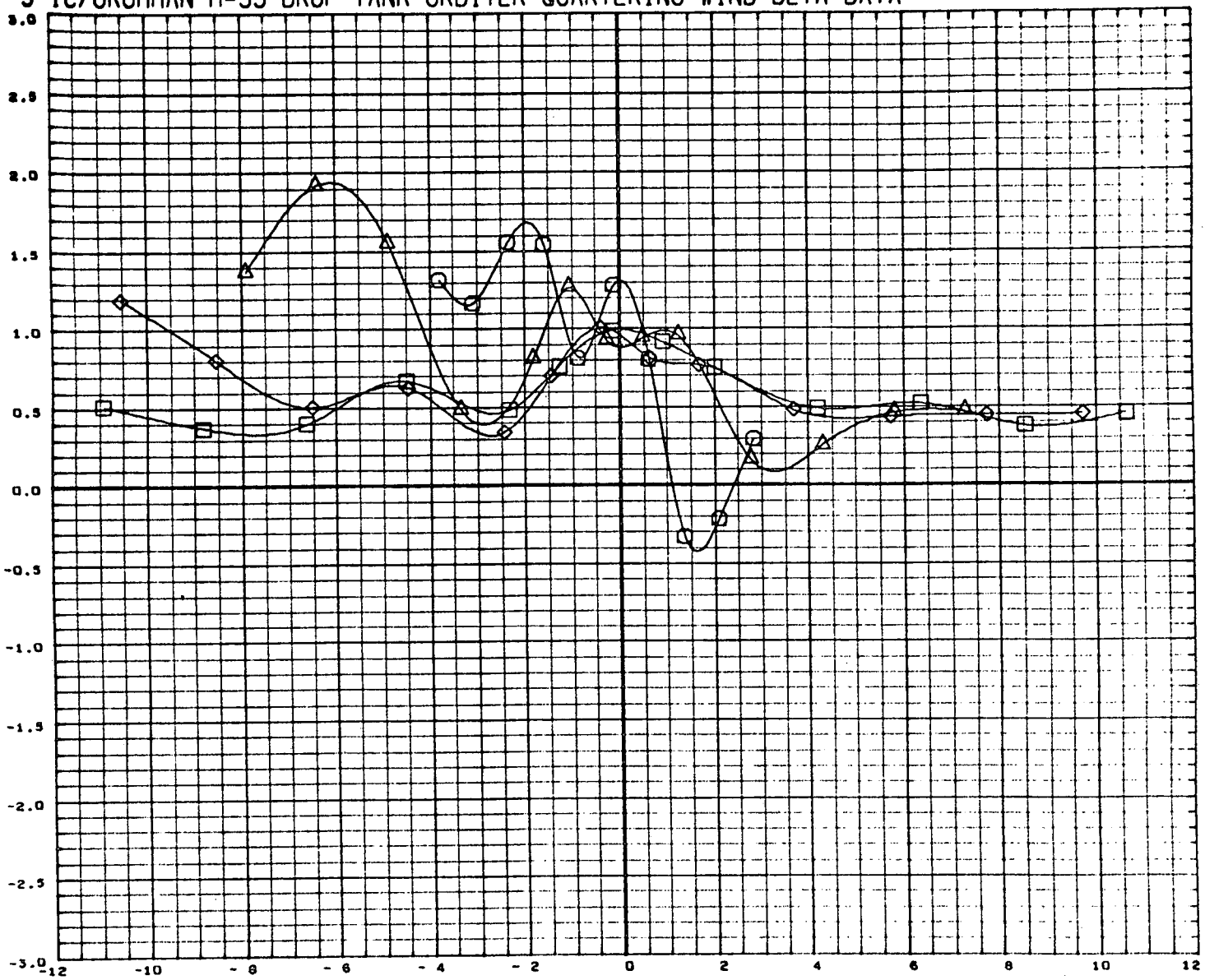
DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.FT.
LREF	1.3330	FT.
BREF	1.3330	FT.
XMRP	5.3990	FT.
YMRP	0.0000	FT.
ZMRP	0.0000	FT.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	20.000
△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 1.001 WNGINC 0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

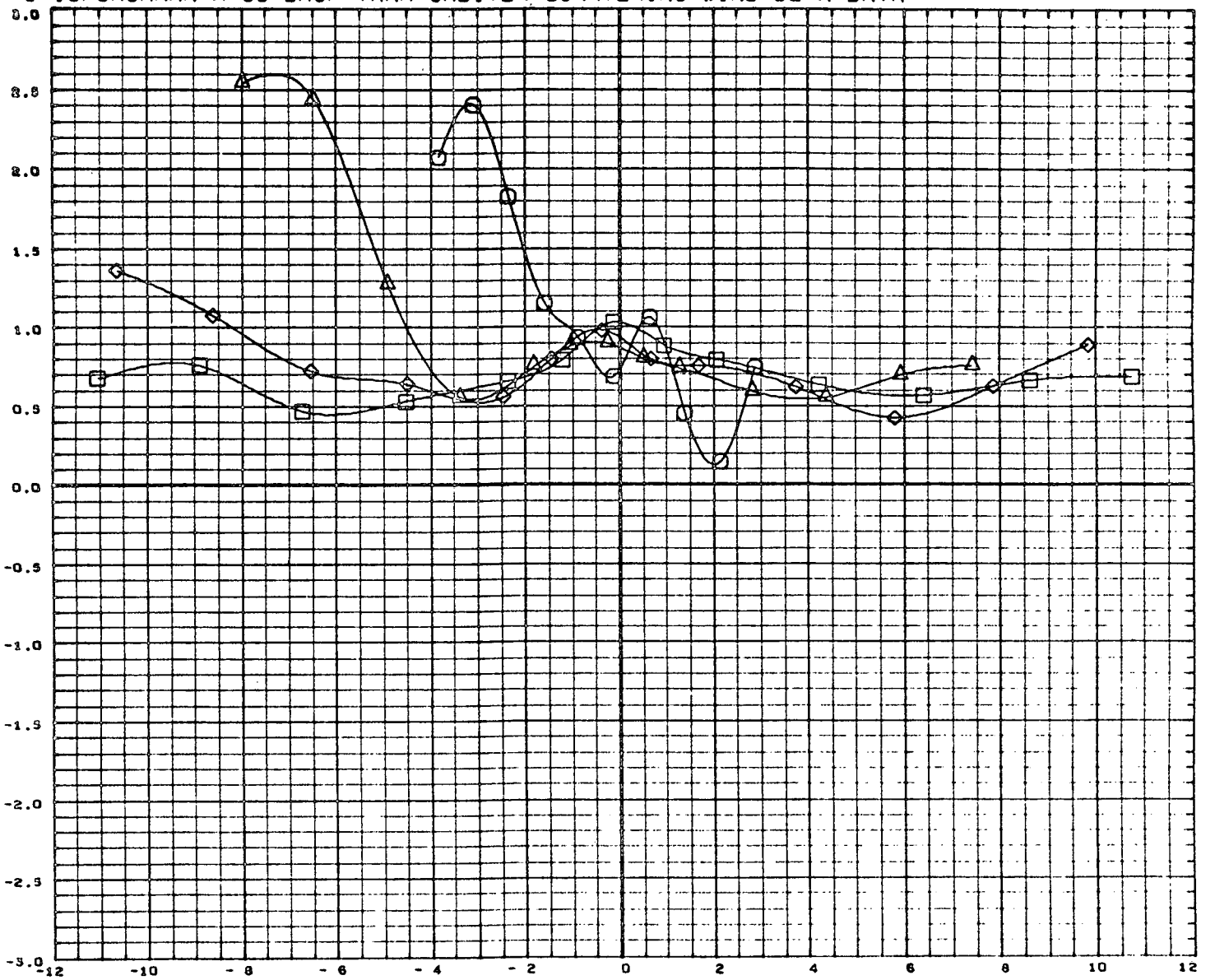
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

M502-MSFC-S1C H-33 ORBITER (ROLL) OWVTCBF (C44042) 12 MAY 72 PAGE 153

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
△	20.000
○	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 1.198 WNGINC 0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3590	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA

SYMBOL	PHI
○	20.000
△	45.000
◇	70.000
□	90.000

PARAMETRIC VALUES

MACH 1.964 WNGINC 0.000

DATA SOURCE

DATASET	PHI	DATASET	PHI
C44042	20.000	C44043	45.000
C44044	70.000	Z44045	90.000

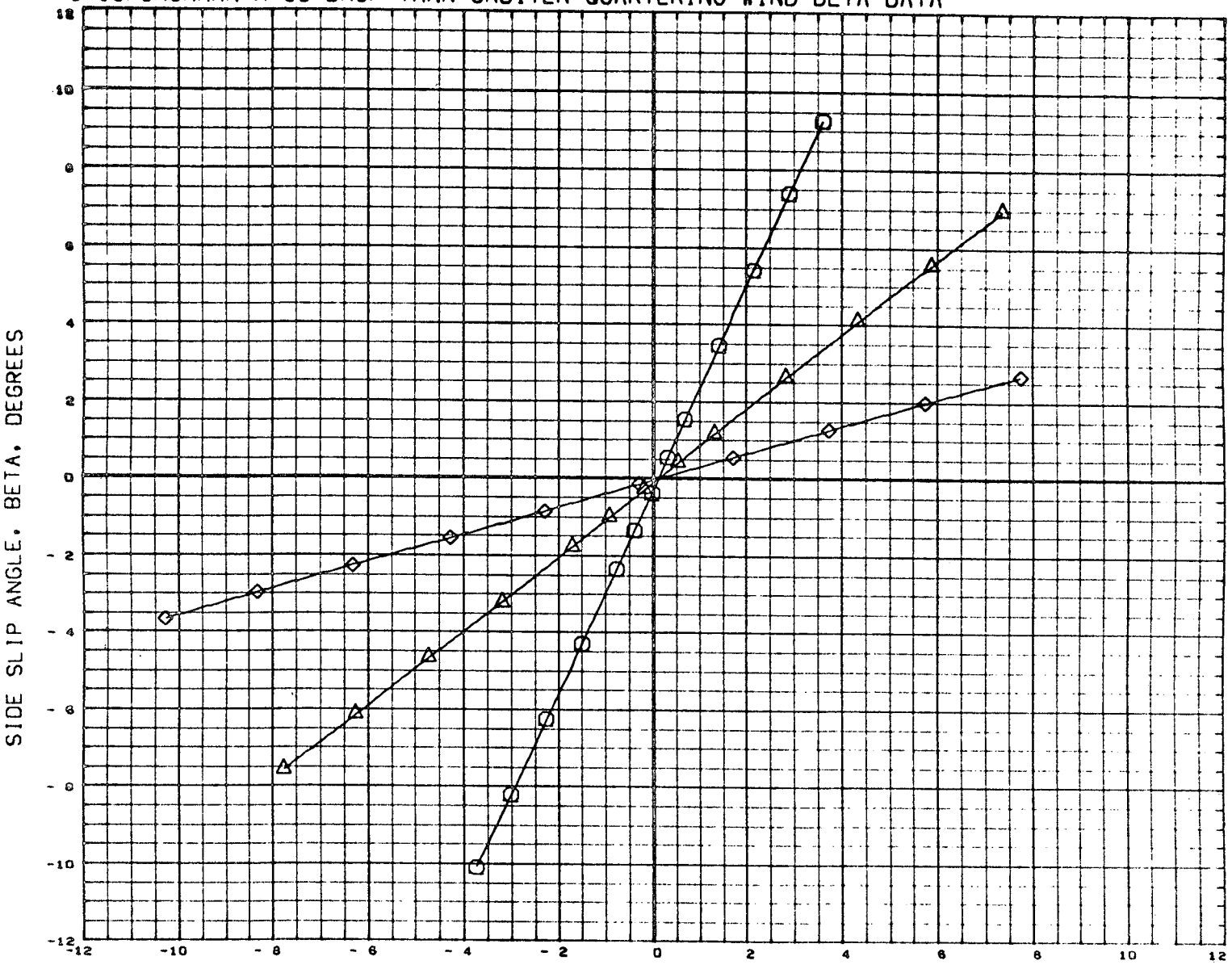
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

M502-MSFC-S1C H-33 ORBITER (ROLL) OWVTCBF (C44042) 12 MAY 72 PAGE 155

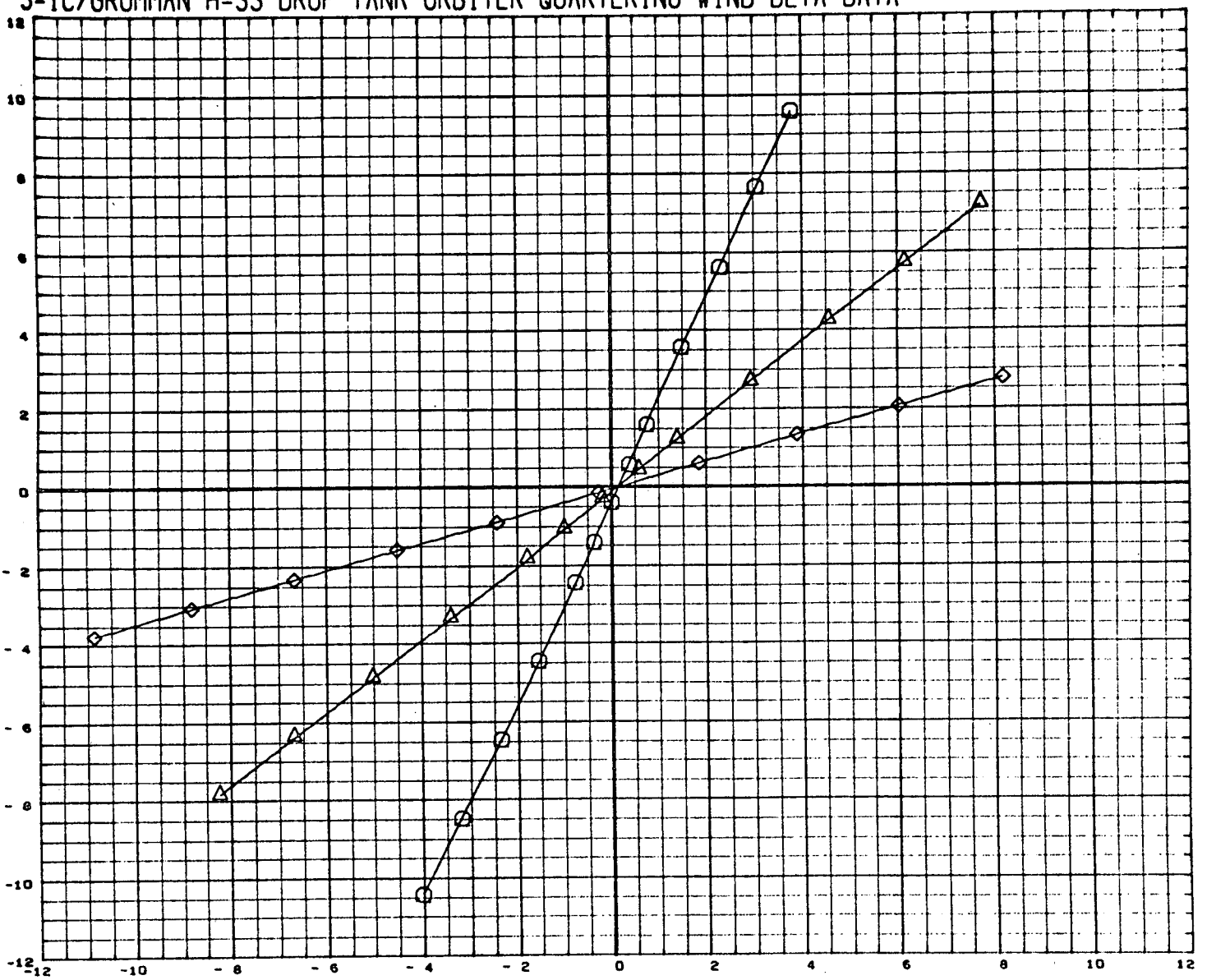
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE				REFERENCE INFORMATION		
○	70.000	MACH	0.600	WNGINC 0.000	DATASET	PHI	DATASET	PHI	SREF	1.3960	SQ.IN.
△	45.000				W44044	70.000	W44043	45.000	LREF	1.3330	IN.
◇	20.000				W44042	20.000			BREF	1.3330	IN.
									XMRP	5.3990	IN.
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCL

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	70.000
△	45.000
◇	20.000

PARAMETRIC VALUES

MACH 0.899 WNGINC 0.000

DATA SOURCE

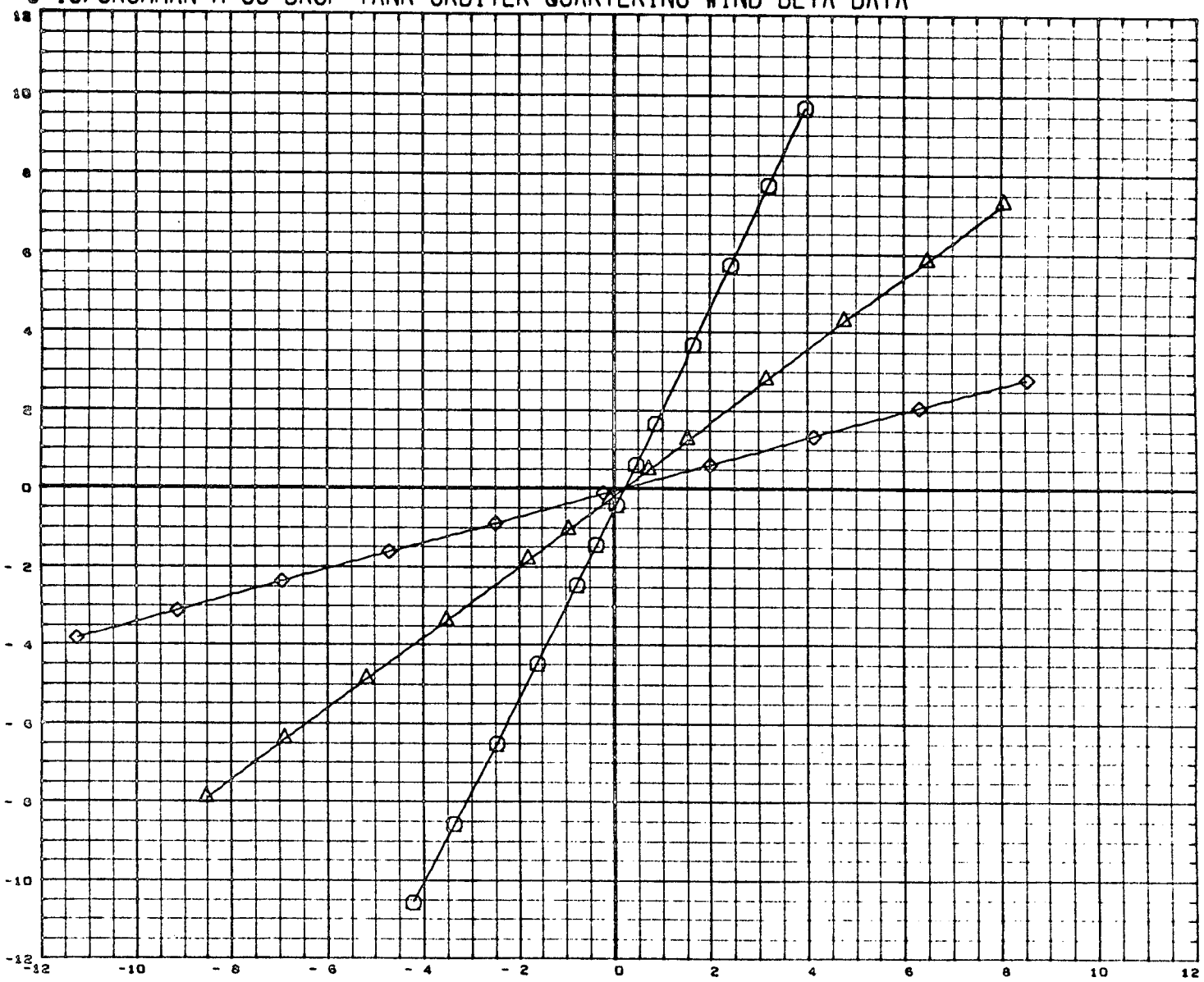
DATASET	PHI
W44044	70.000
W44042	20.000
W44043	45.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCL

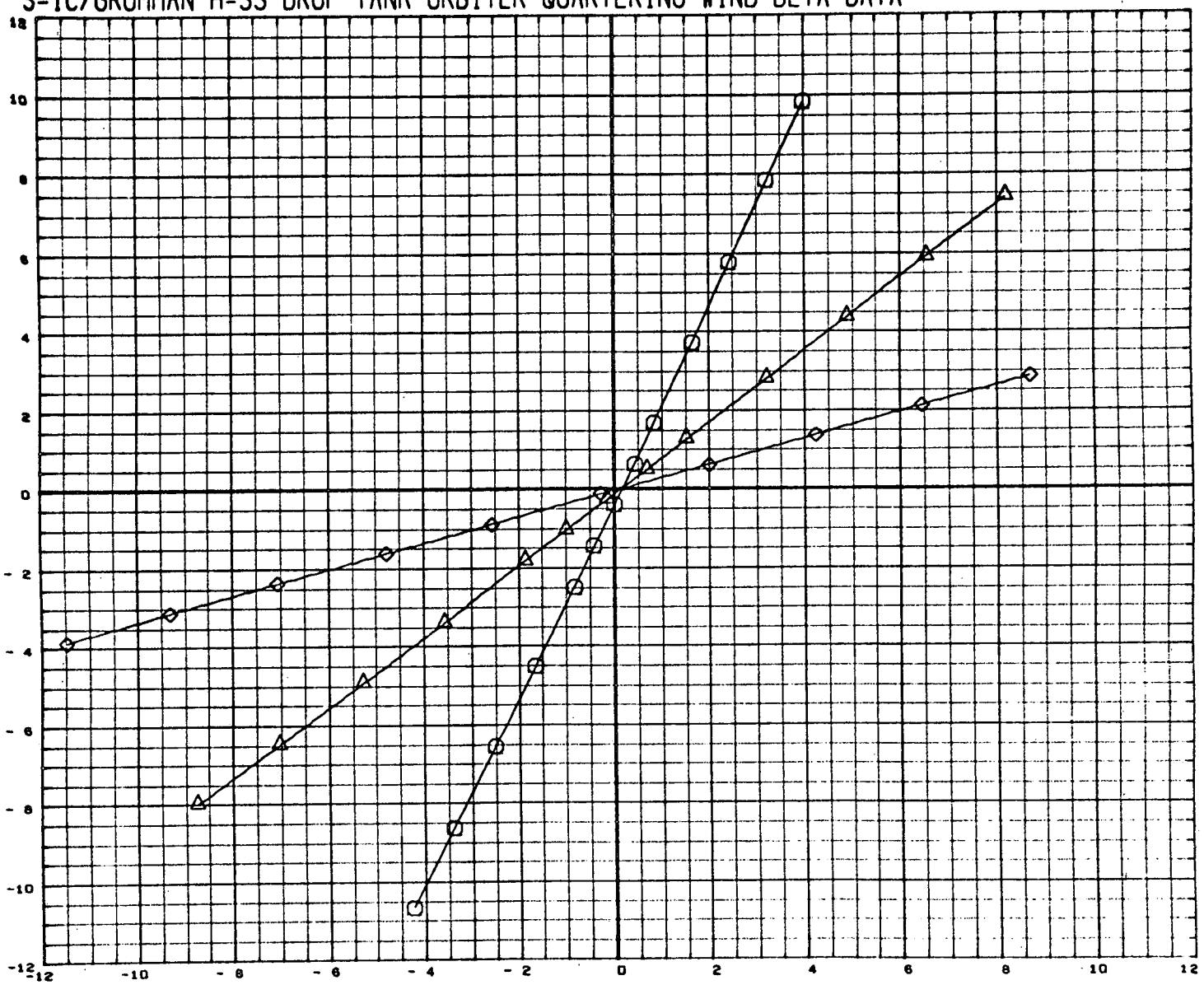
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES				DATA SOURCE				REFERENCE INFORMATION		
○	70.000	MACH	1.000	WNGINC	0.000	DATASET	PHI	DATASET	PHI	SREF	1.3960	SQ.IN.
△	45.000					W44044	70.000	W44043	45.000	LREF	1.3330	IN.
◇	20.000					W44042	20.000			BREF	1.3330	IN.
										XMRP	5.3990	IN.
										YMRP	0.0000	IN.
										ZMRP	0.0000	IN.
										SCALE	0.0034	

DATA HIST. CODE CCCL

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	70.000
△	45.000
◇	20.000

PARAMETRIC VALUES

MACH 1.200 WNGINC 0.000

DATA SOURCE

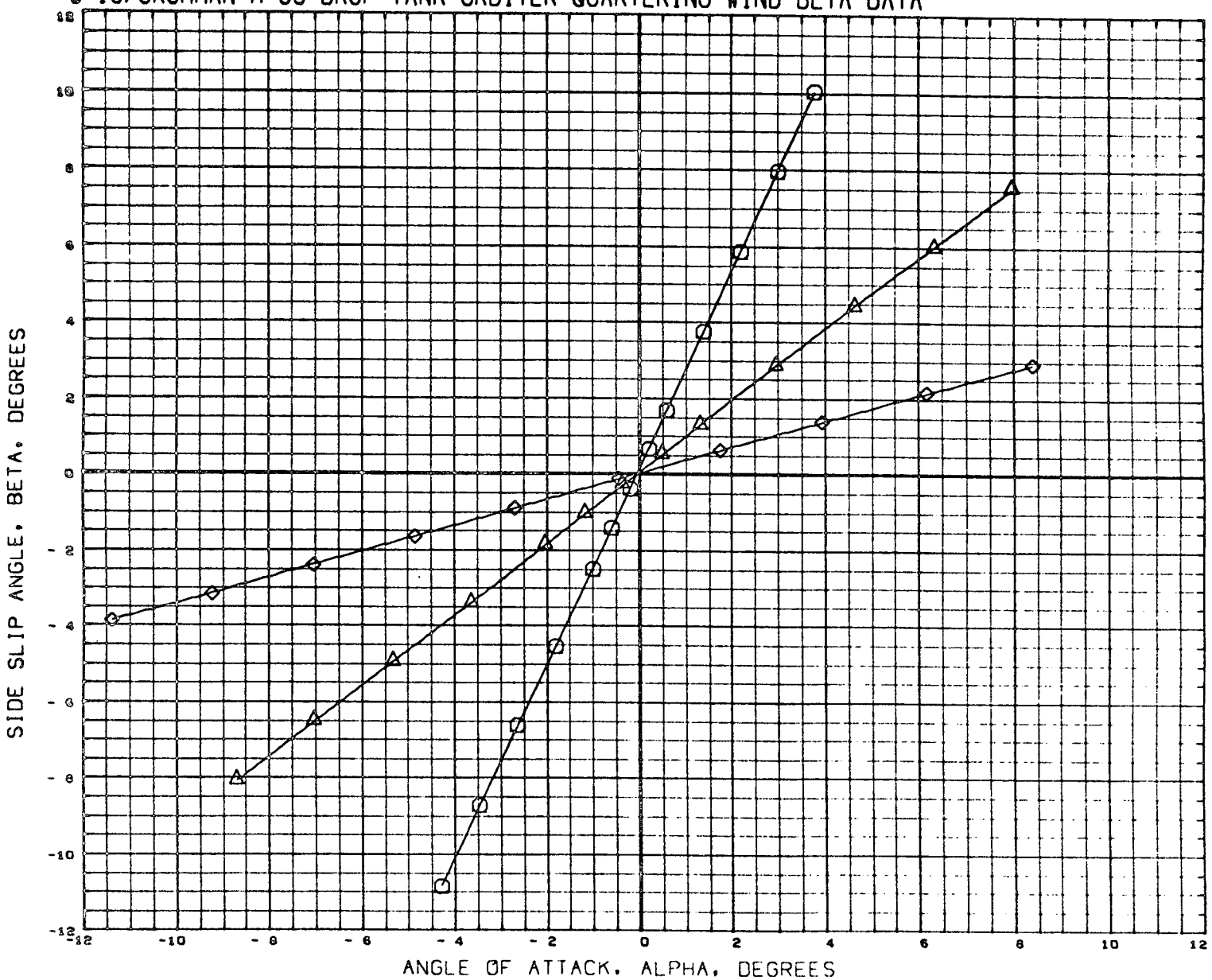
DATASET	PHI	DATASET	PHI
W44044	70.000	W44043	45.000
W44042	20.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCL

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI
○	70.000
△	45.000
◇	20.000

PARAMETRIC VALUES

MACH 1.961 WNGINC 0.000

DATA SOURCE

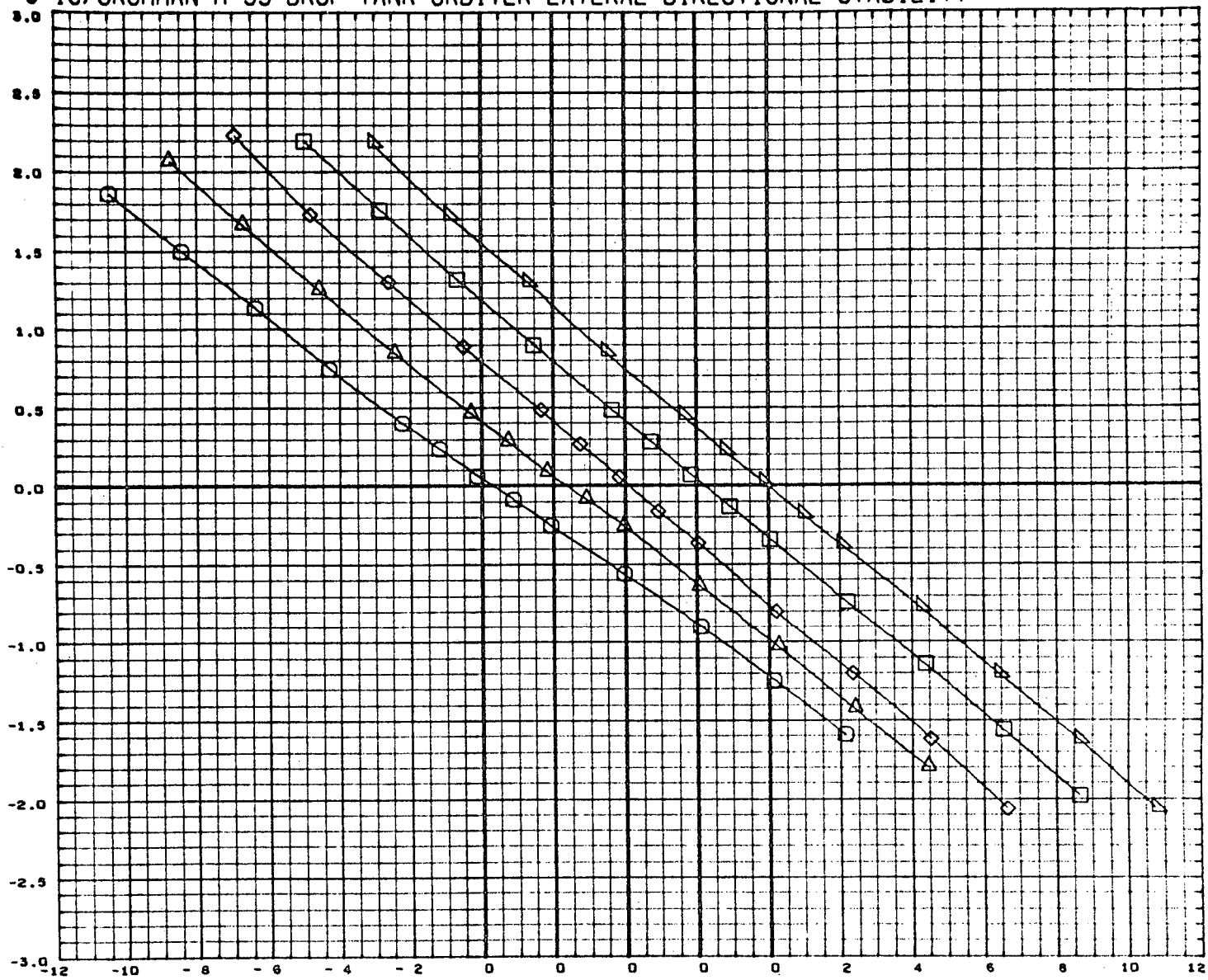
	DATASET	PHI	DATASET	PHI
○	W44044	70.000	W44043	45.000
△	W44042	20.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA MIST. CODE CCCL

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	0.604
△	0.907
◇	1.001
□	1.102
⊠	1.201

PARAMETRIC VALUES

ALPHA 0.000 PHI 90.000

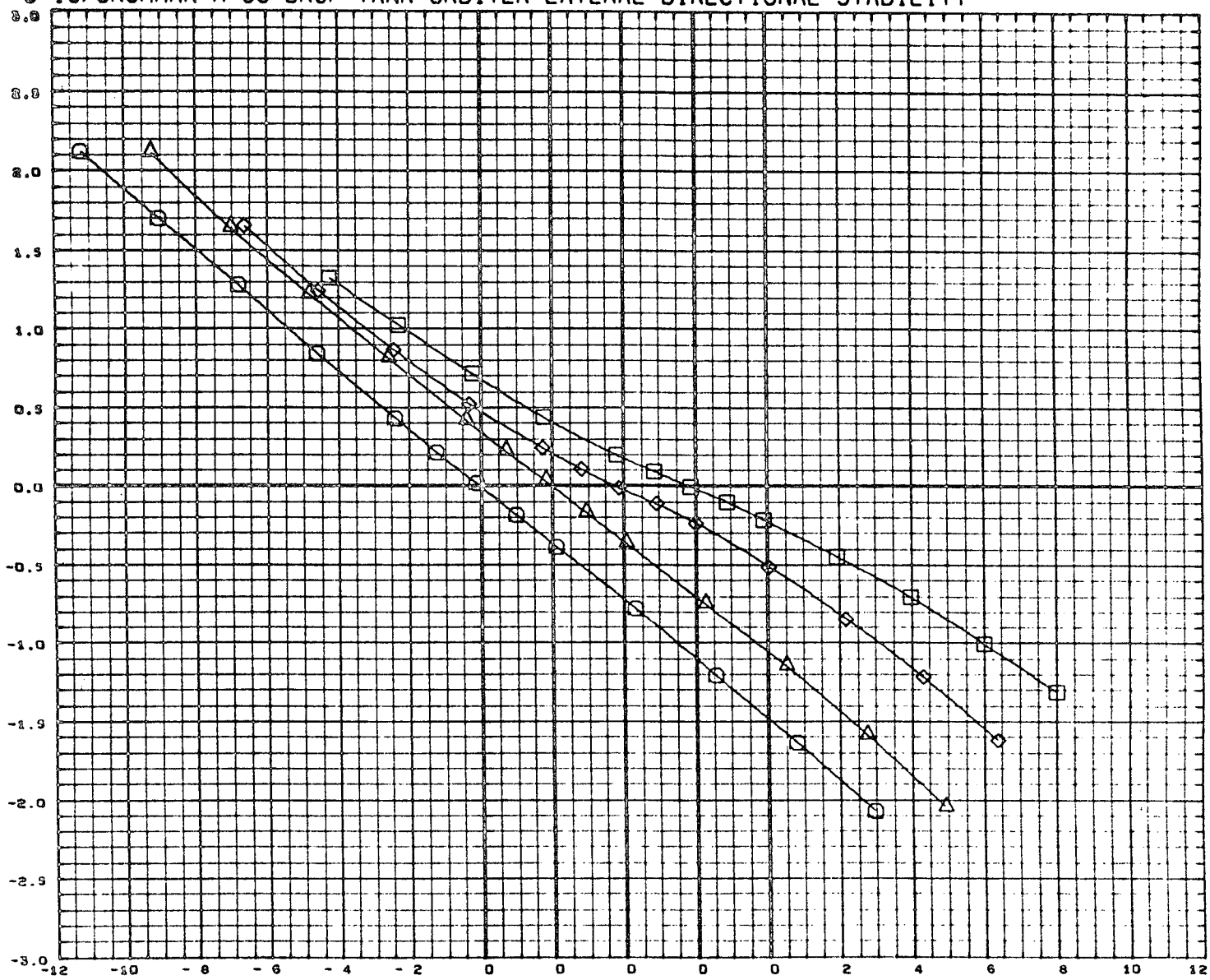
WNGINC 0.000

DATA HIST. CODE *ACCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

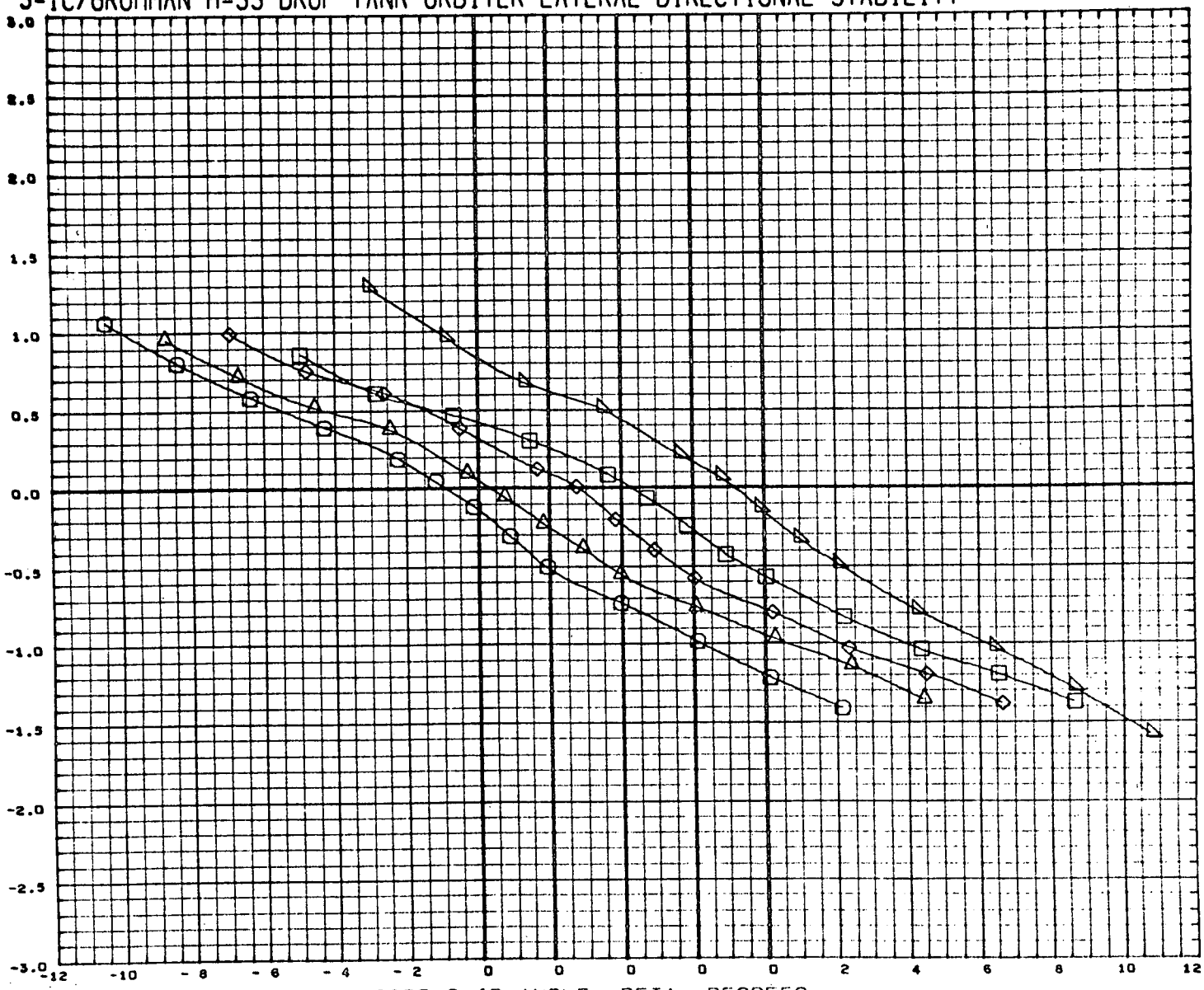


SYMBOL	MACH	PARAMETRIC VALUES			
○	1.463	ALPHA	0.000	PHI	90.000
△	1.964	WNGINC	0.000		
◇	3.480				
□	4.959				

DATA HIST. CODE *ACCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	0.604
△	0.907
◇	1.001
□	1.102
◸	1.201

PARAMETRIC VALUES

ALPHA 0.000 PHI 90.000

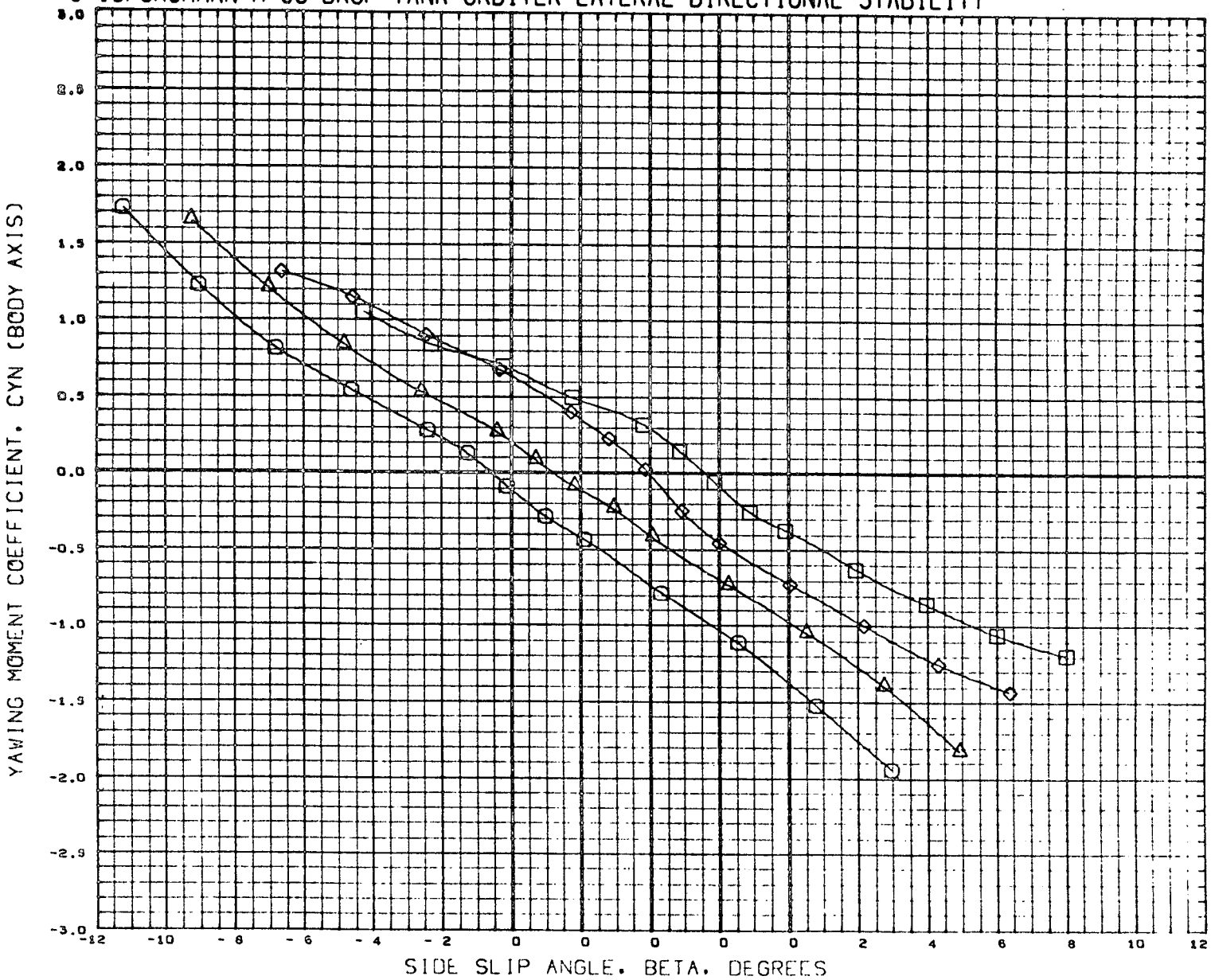
WNGINC 0.000

DATA HIST. CODE *ACCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	1.463
△	1.964
◇	3.480
□	4.939

PARAMETRIC VALUES

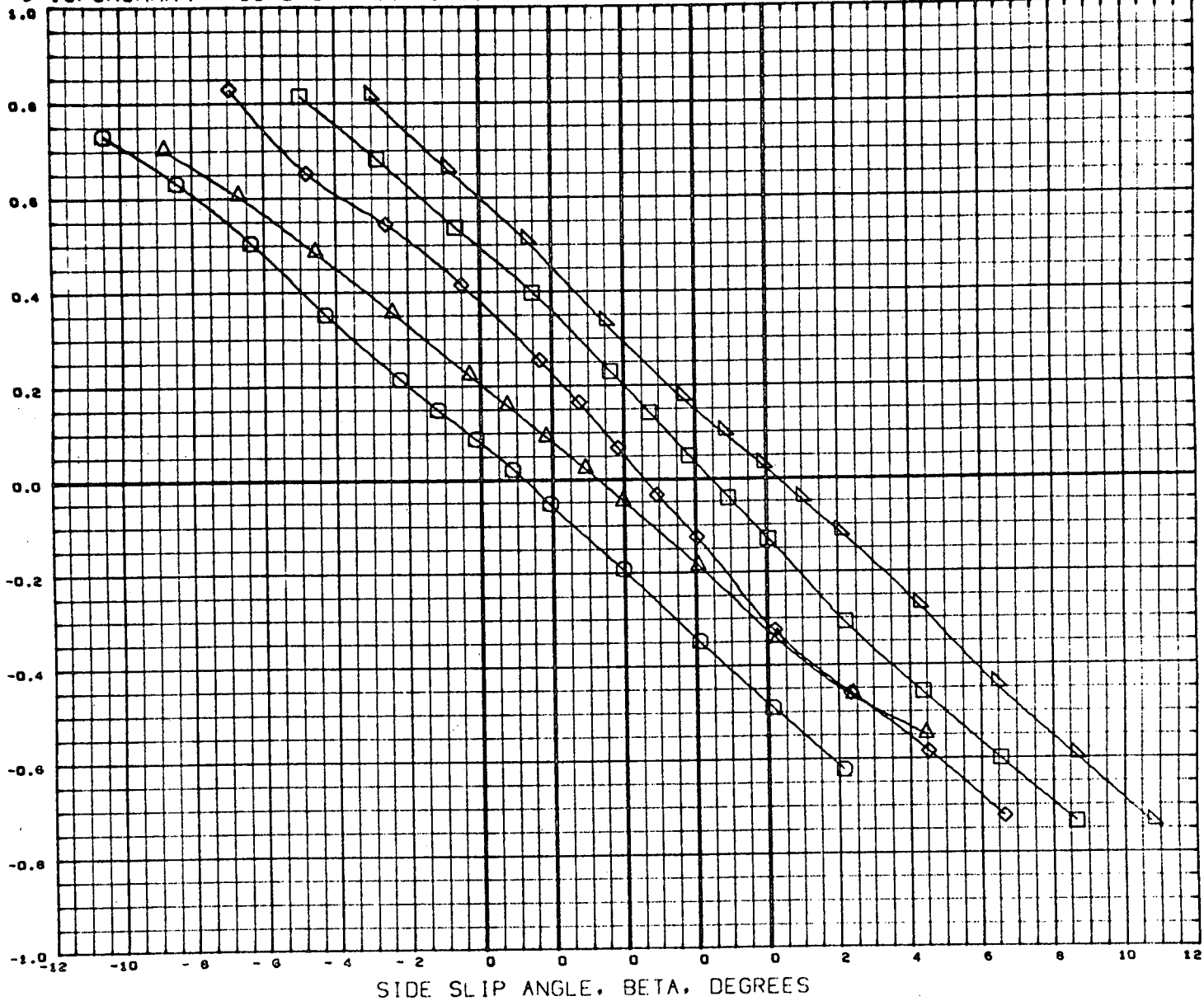
ALPHA	0.000	PHI	90.000
WNGINC	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.FT.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	0.604
△	0.907
◇	1.001
□	1.102
▷	1.201

PARAMETRIC VALUES

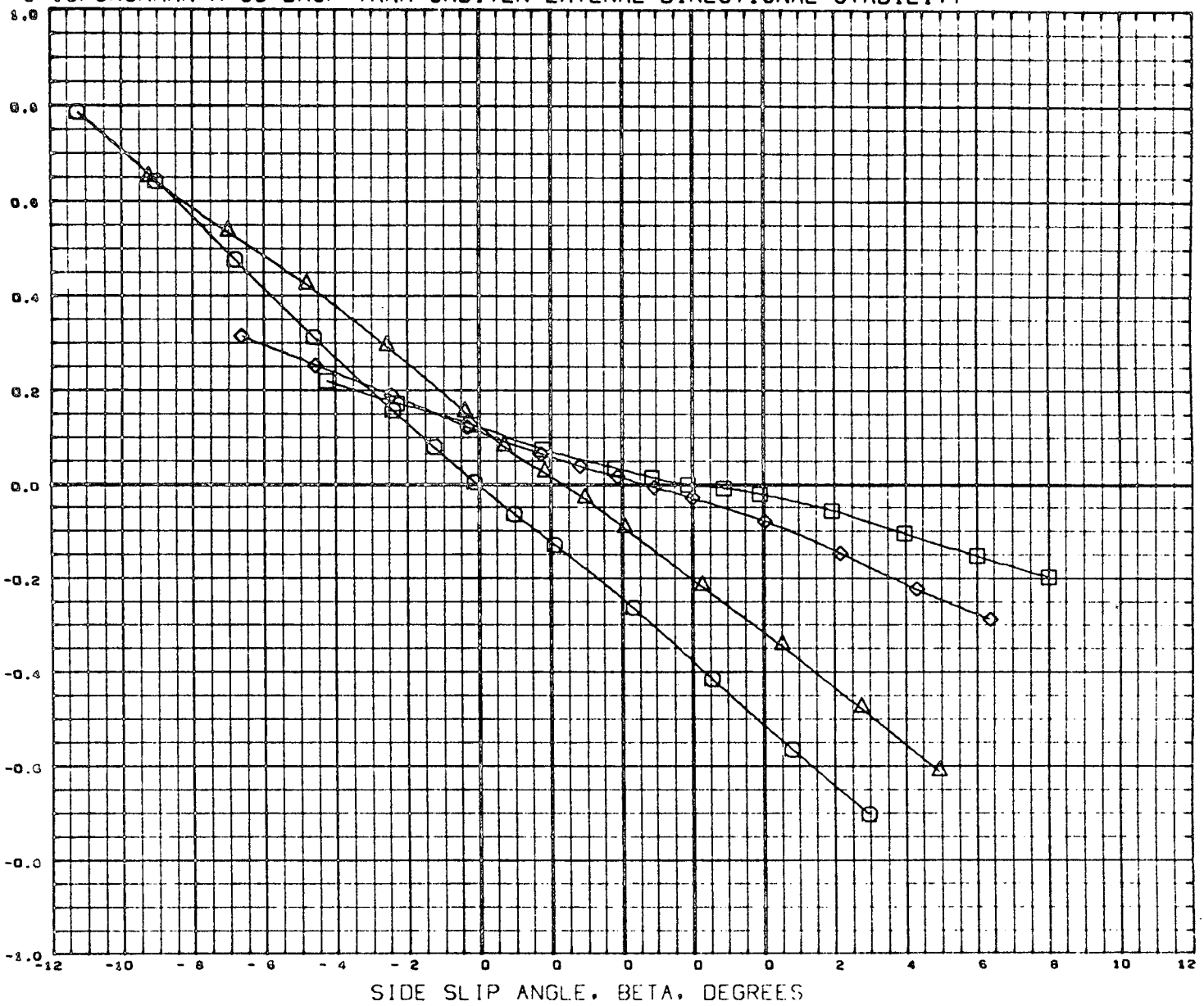
ALPHA	0.000	PHI	90.000
WNGINC	0.000		

DATA HIST. CODE *ACCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES		
○	1.463	ALPHA	0.000	PHI	90.000
△	1.964	WNGINC	0.000		
◇	3.480				
□	4.959				

DATA HIST. CODE *ACCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

SYMBOL	MACH
▽	0.604
□	0.907
◇	1.001
△	1.102
○	1.201

PARAMETRIC VALUES

ALPHA	0.000	PHI	90.000
WNGINC	0.000		

DATA HIST. CODE *ACCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

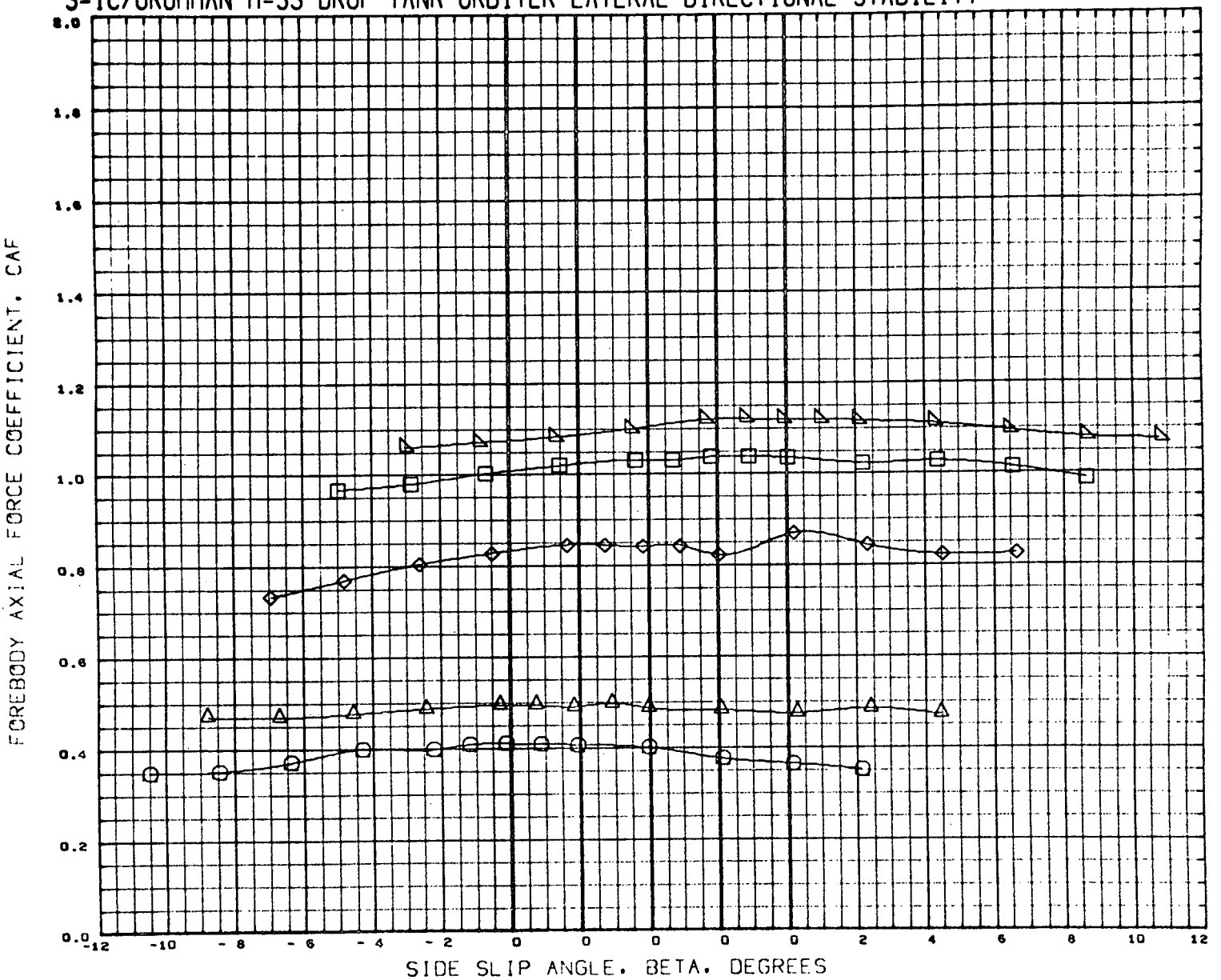
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

SYMBOL	MACH	PARAMETRIC VALUES			
○	1.463	ALPHA	0.000	PHI	90.000
△	1.964	WNGINC	0.000		
◇	3.480				
□	4.959				

DATA HIST. CODE *ACCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	0.604
△	0.907
◇	1.001
□	1.102
▽	1.201

PARAMETRIC VALUES

ALPHA 0.000 PHI 90.000

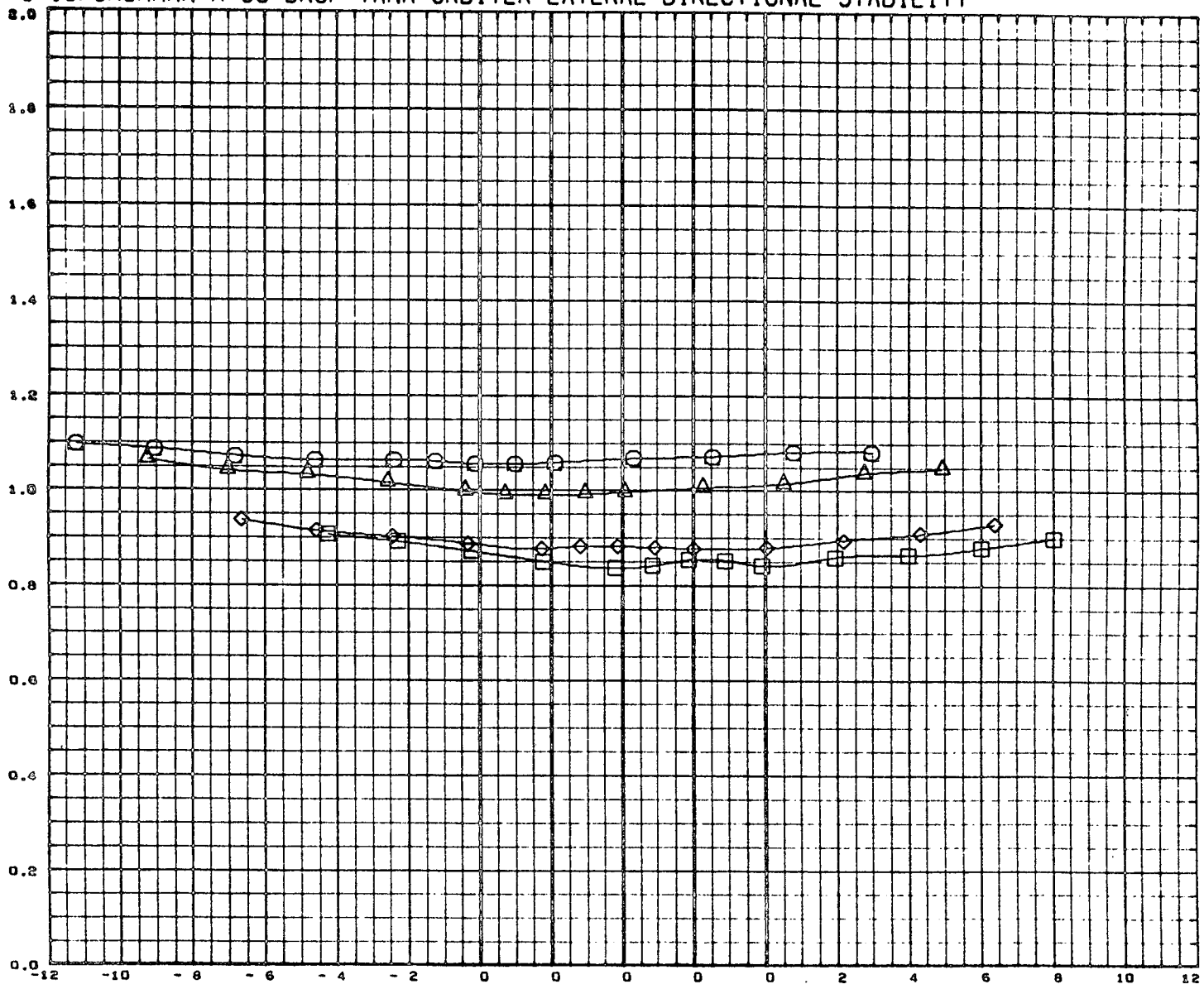
WNGINC 0.000

DATA HIST. CODE *ACCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	1.463
△	1.964
◇	3.460
□	4.959

PARAMETRIC VALUES

ALPHA 0.000 PHI 90.000

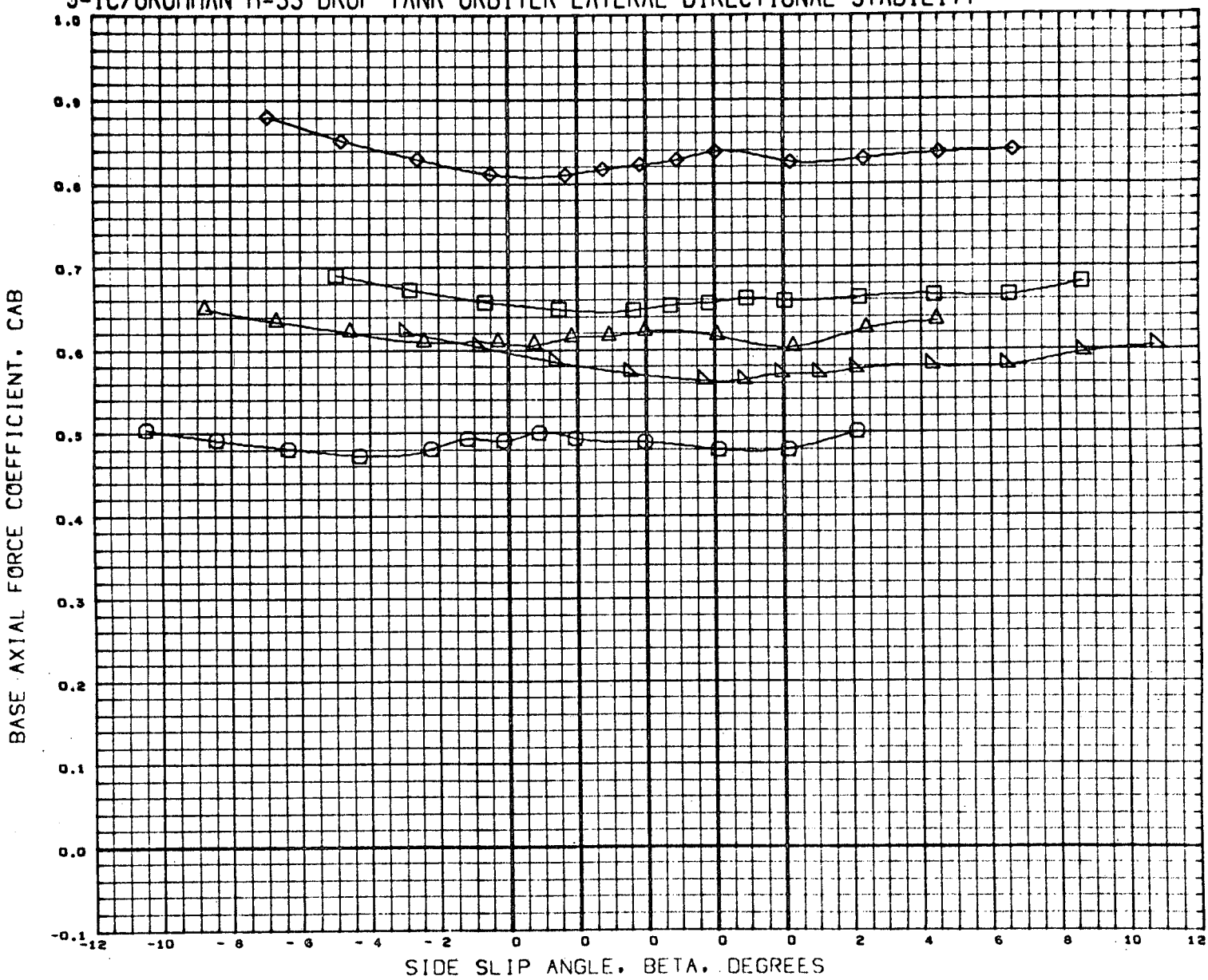
WNGINC 0.000

DATA HIST. CODE *ACCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



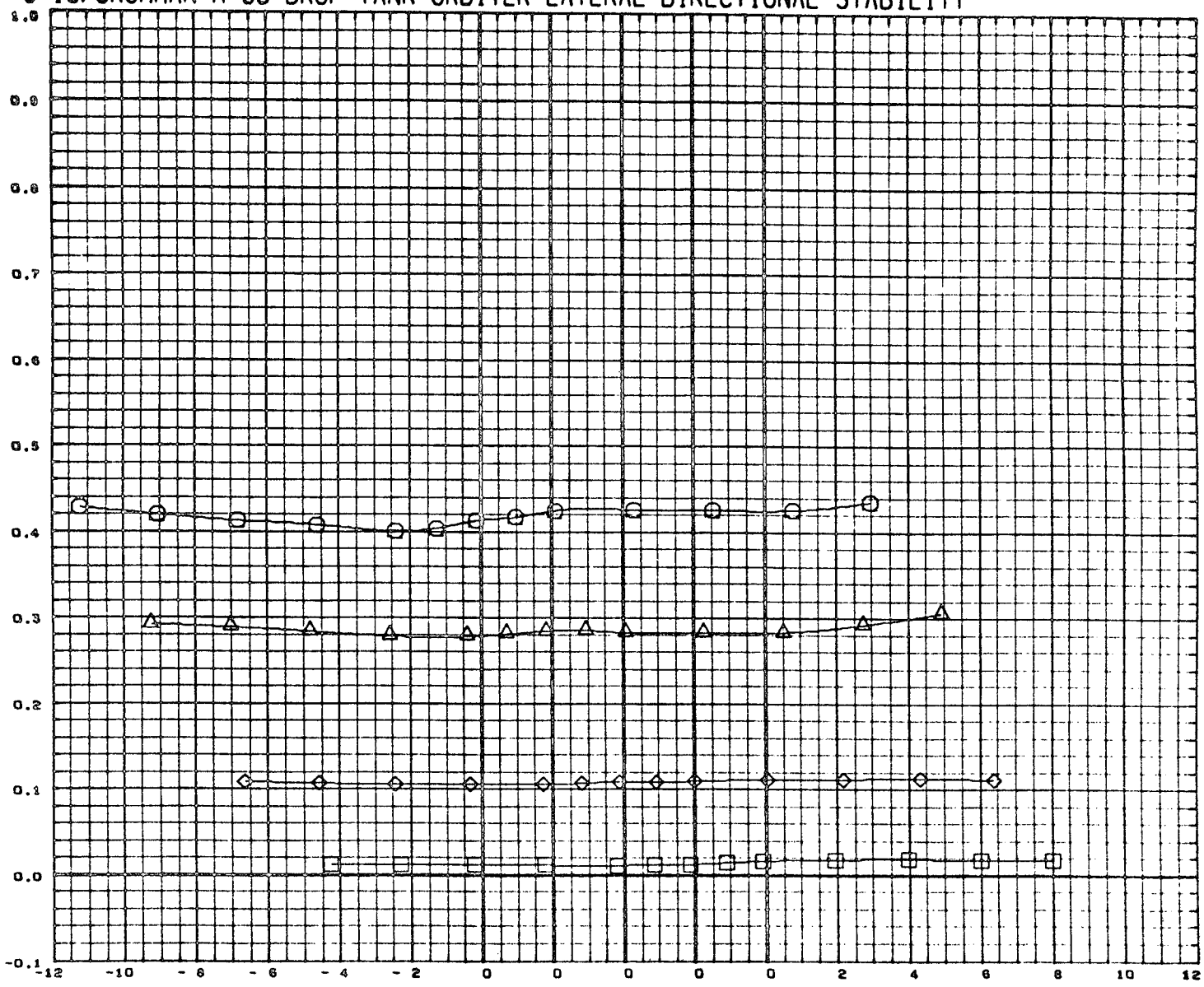
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.604	ALPHA	0.000	PHI	90.000
△	0.907	WNGINC	0.000		
◇	1.001				
□	1.102				
▽	1.201				

DATA HIST. CODE *ACCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

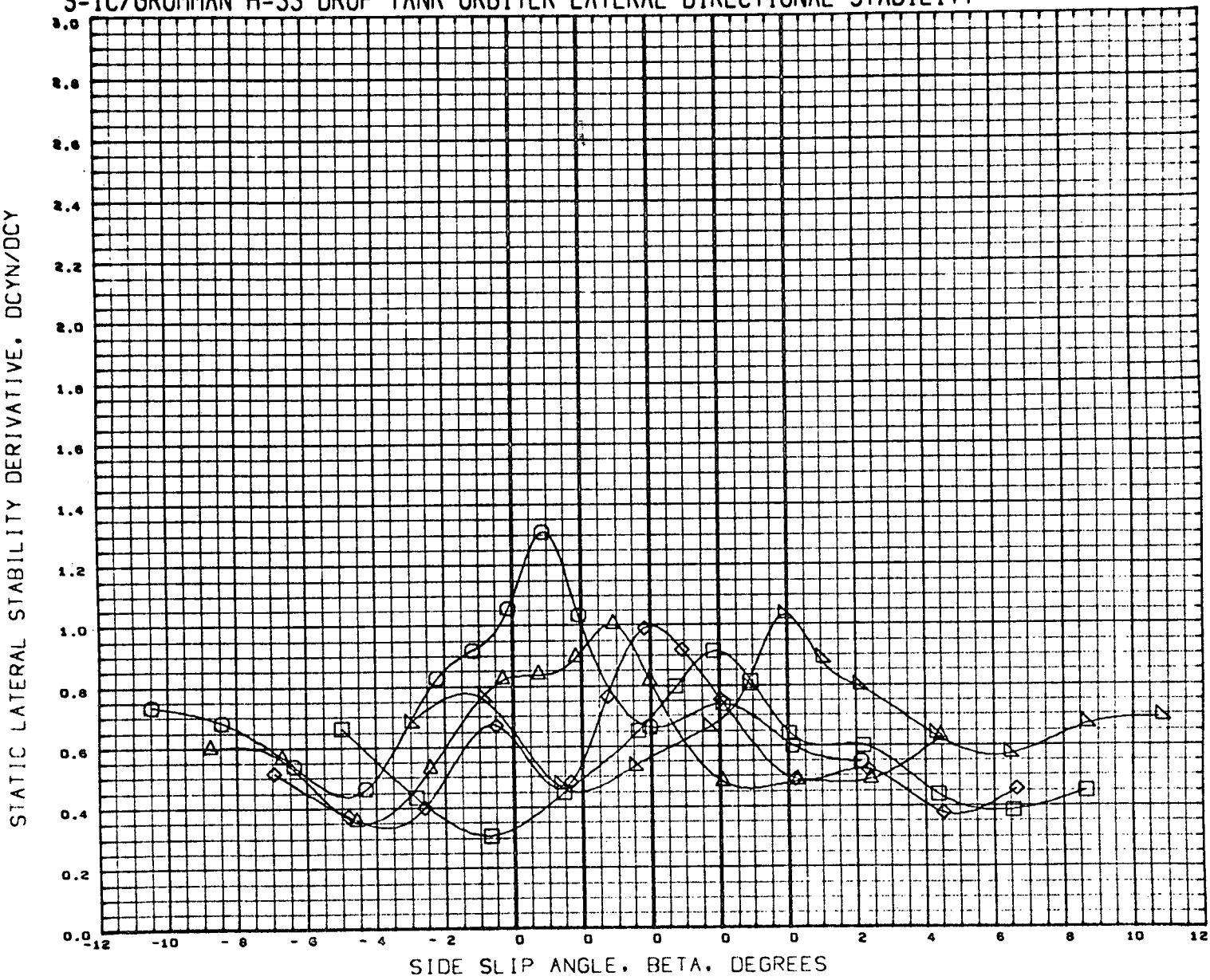


SYMBOL	MACH		PARAMETRIC VALUES		
○	1.463	ALPHA	0.000	PHI	90.000
△	1.964	WNGINC	0.000		
◇	3.460				
□	4.959				

DATA HIST. CODE *ACCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	0.604
△	0.907
◇	1.001
□	1.102
⊠	1.201

PARAMETRIC VALUES

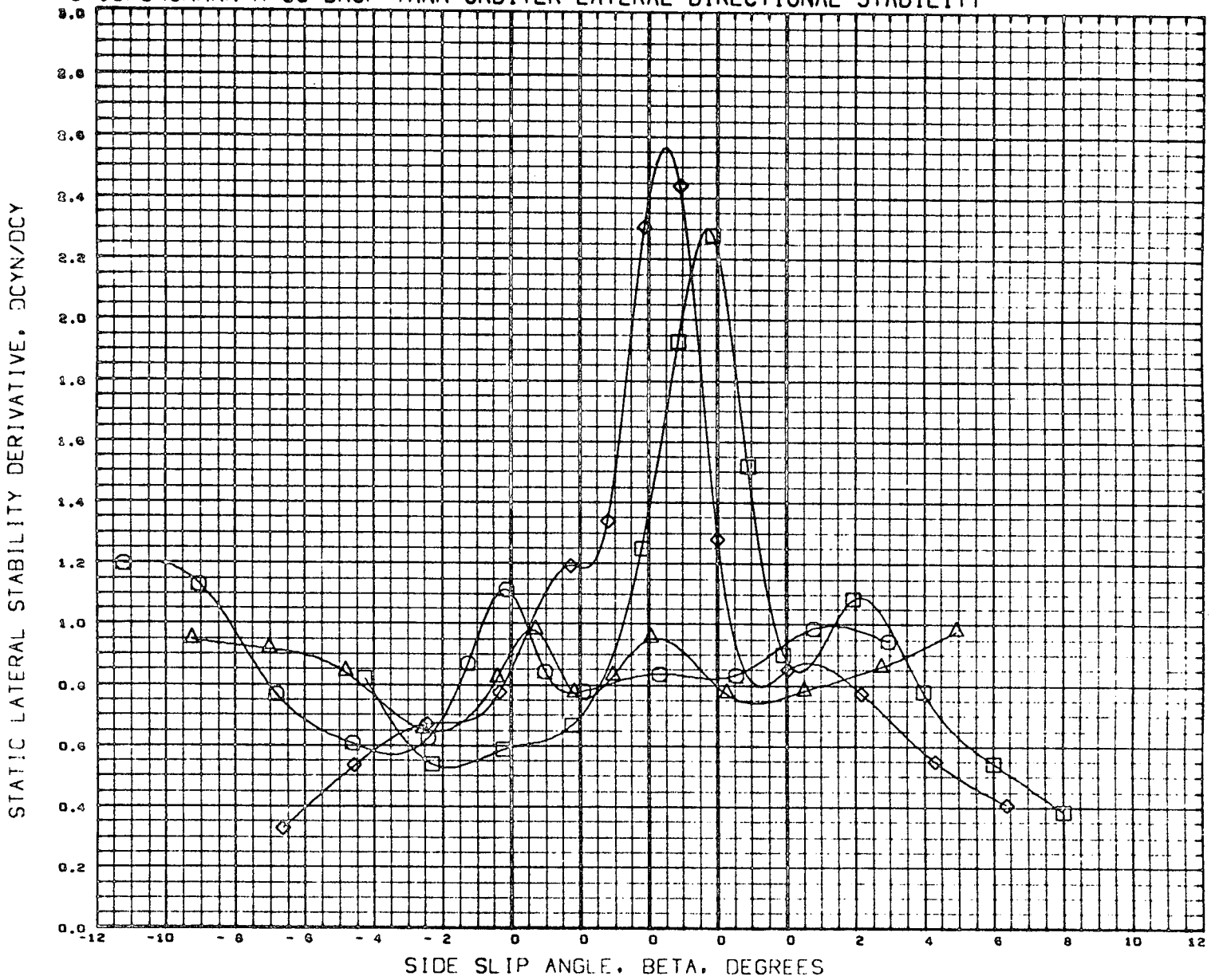
ALPHA	0.000	PHI	90.000
WNGINC	0.000		

DATA HIST. CODE *ACCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-IC/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

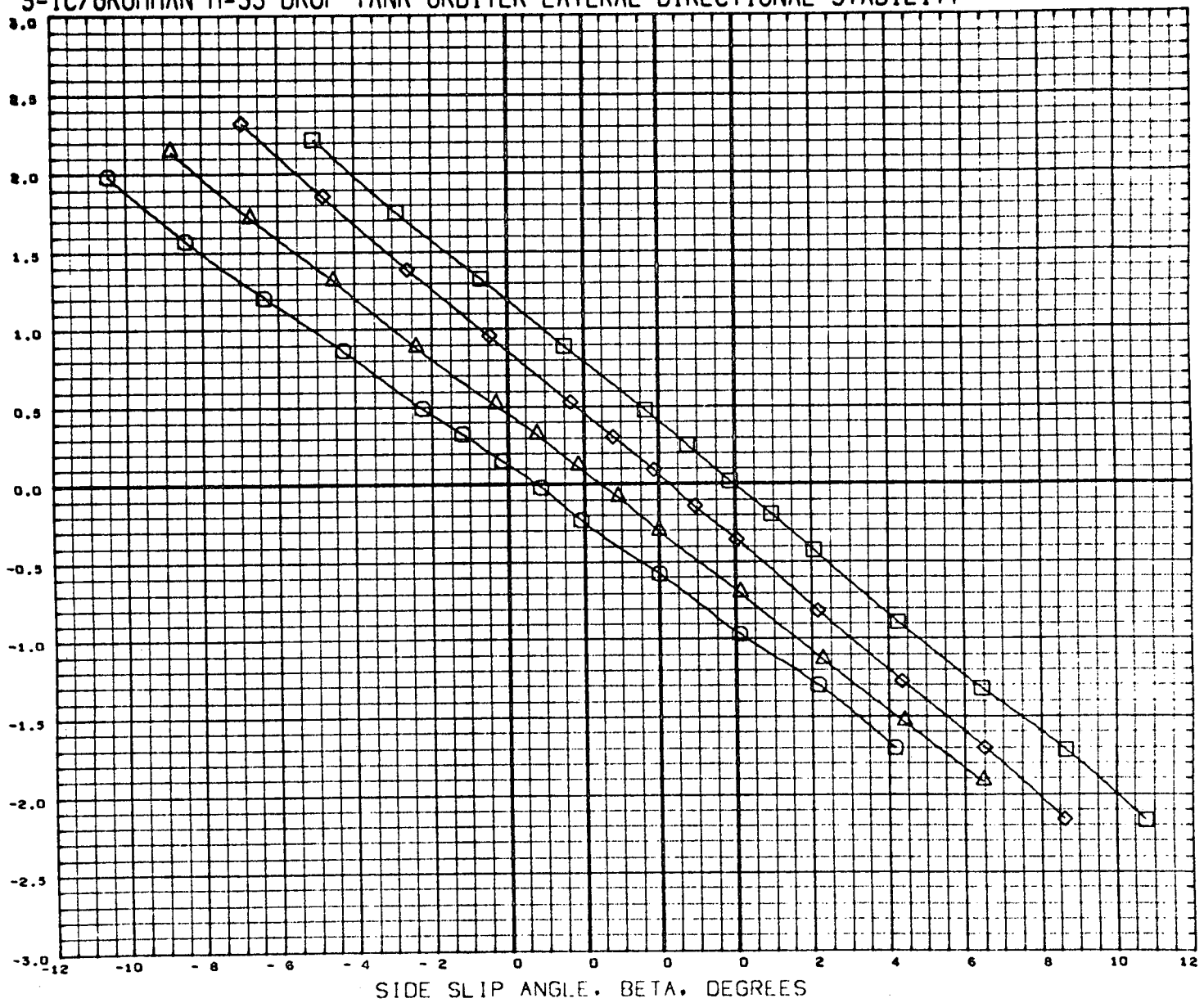


SYMBOL	MACH	PARAMETRIC VALUES			
□	1.463	ALPHA	0.000	PHI	90.000
◇	1.964	WNGINC	0.000		
△	3.480				
○	4.959				

DATA HIST. CODE *ACCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	0.596
△	0.903
◇	0.997
□	1.200

PARAMETRIC VALUES

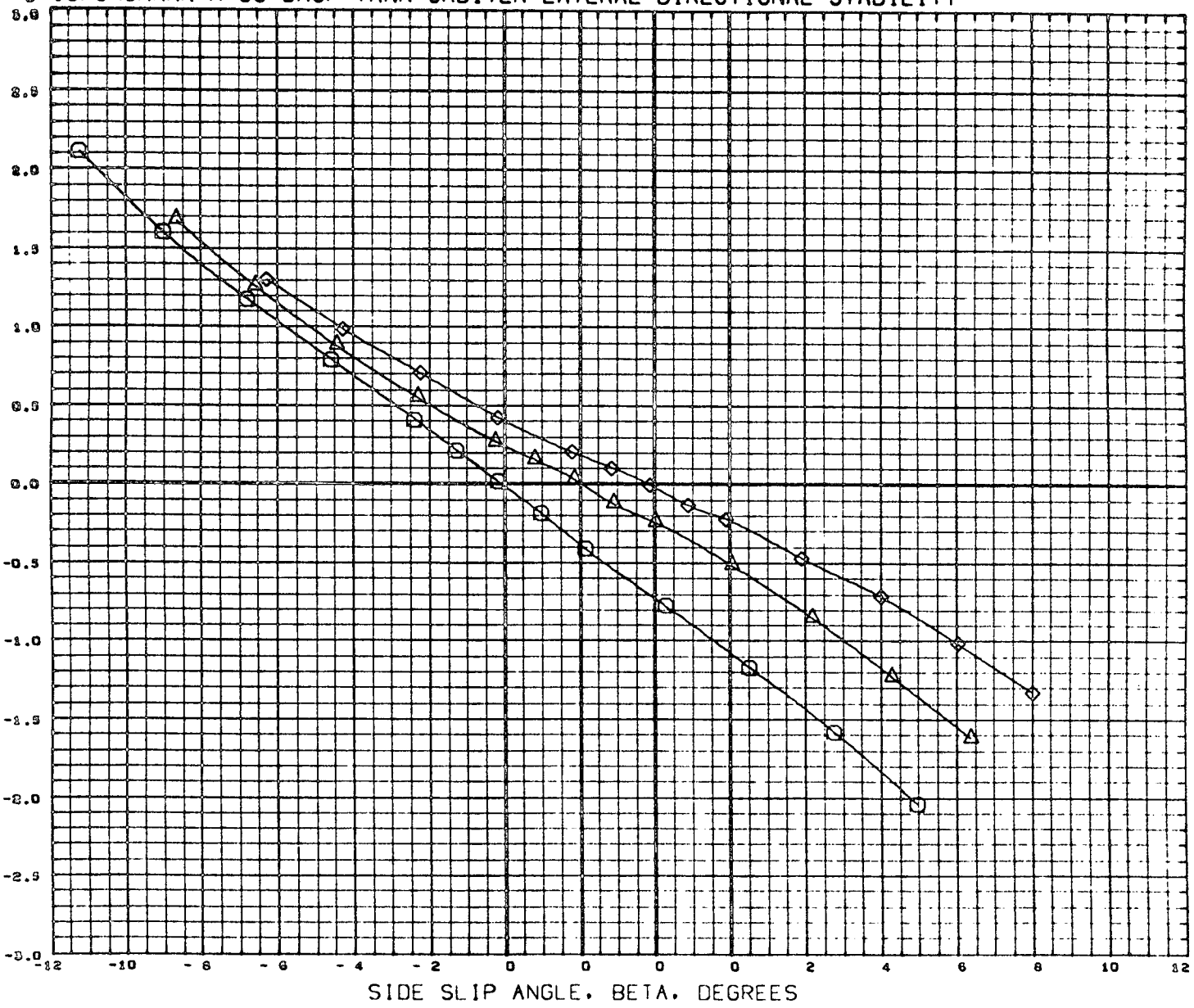
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



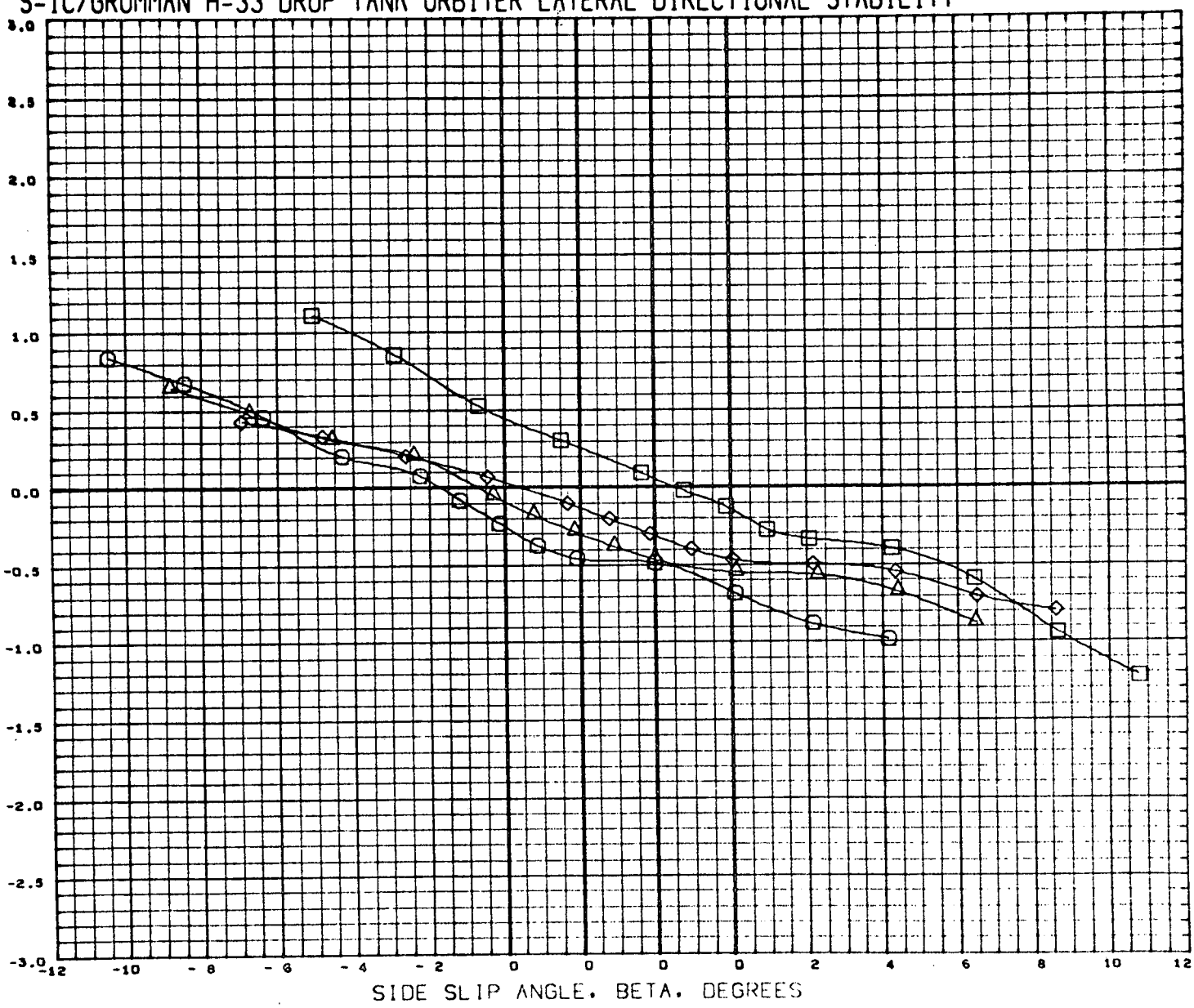
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.964	ALPHA	0.000	PHI	90.000
△	3.480	WNGIN	0.000		
◇	4.999				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	0.596
△	0.903
◇	0.997
□	1.200

PARAMETRIC VALUES

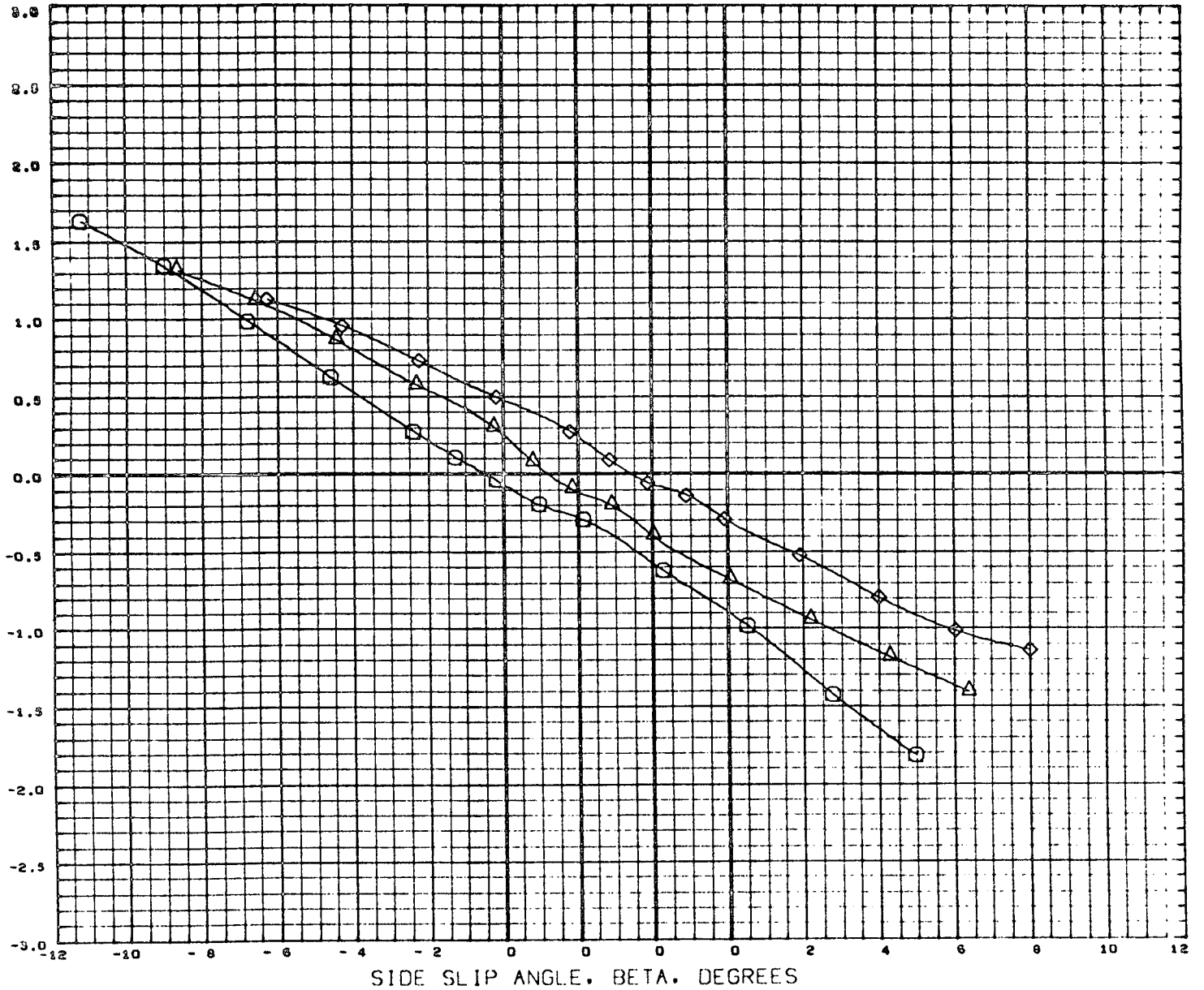
ALPHA	0.000	PHI	90.000	
WNGIN	0.000			

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



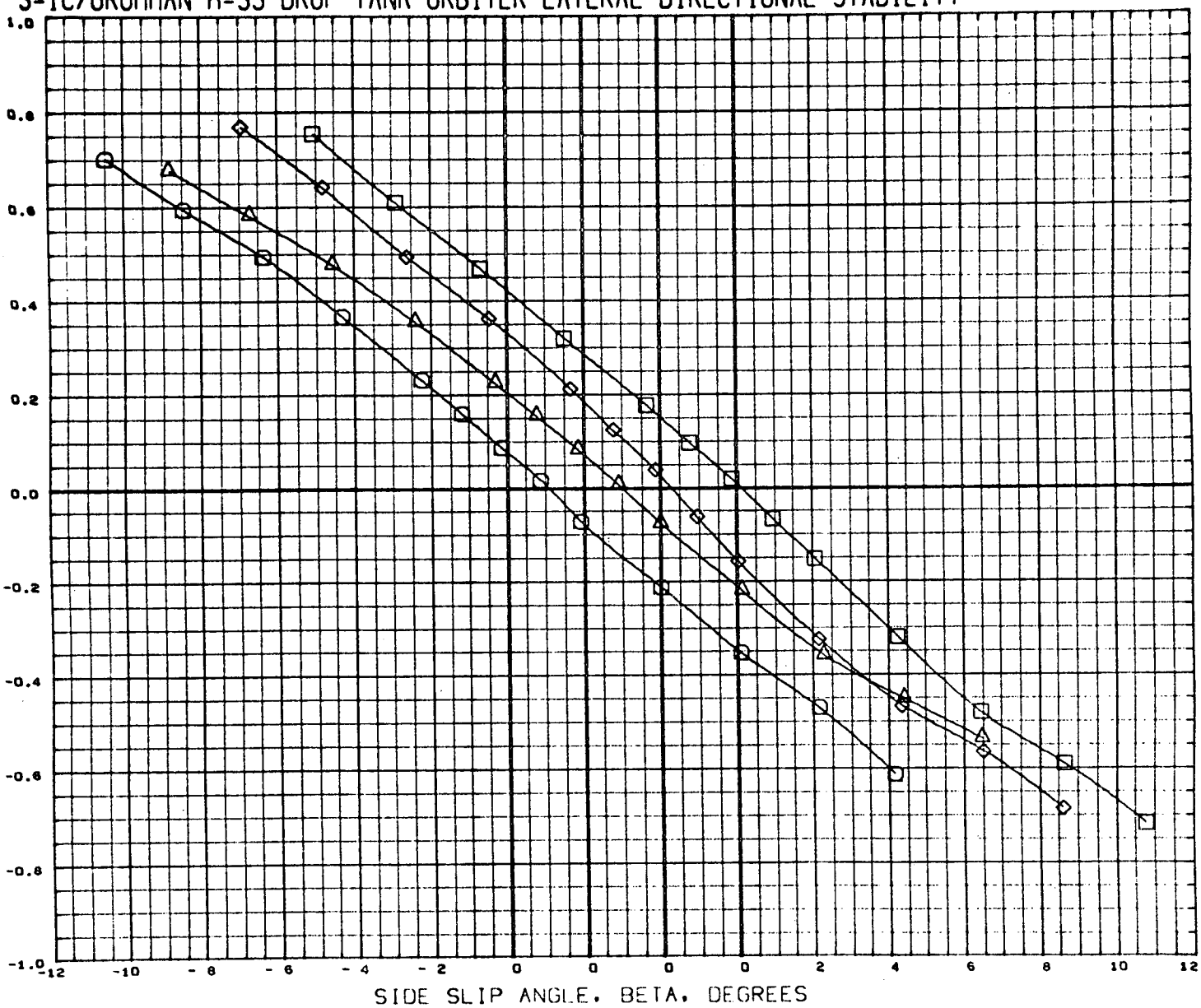
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.964	ALPHA	0.000	PHI	90.000
△	3.480	WBGIN	0.000		
◇	4.959				

REFERENCE INFORMATION

SREF	1.3960	SQ.FT.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA MIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	0.596
△	0.903
◇	0.997
□	1.200

PARAMETRIC VALUES

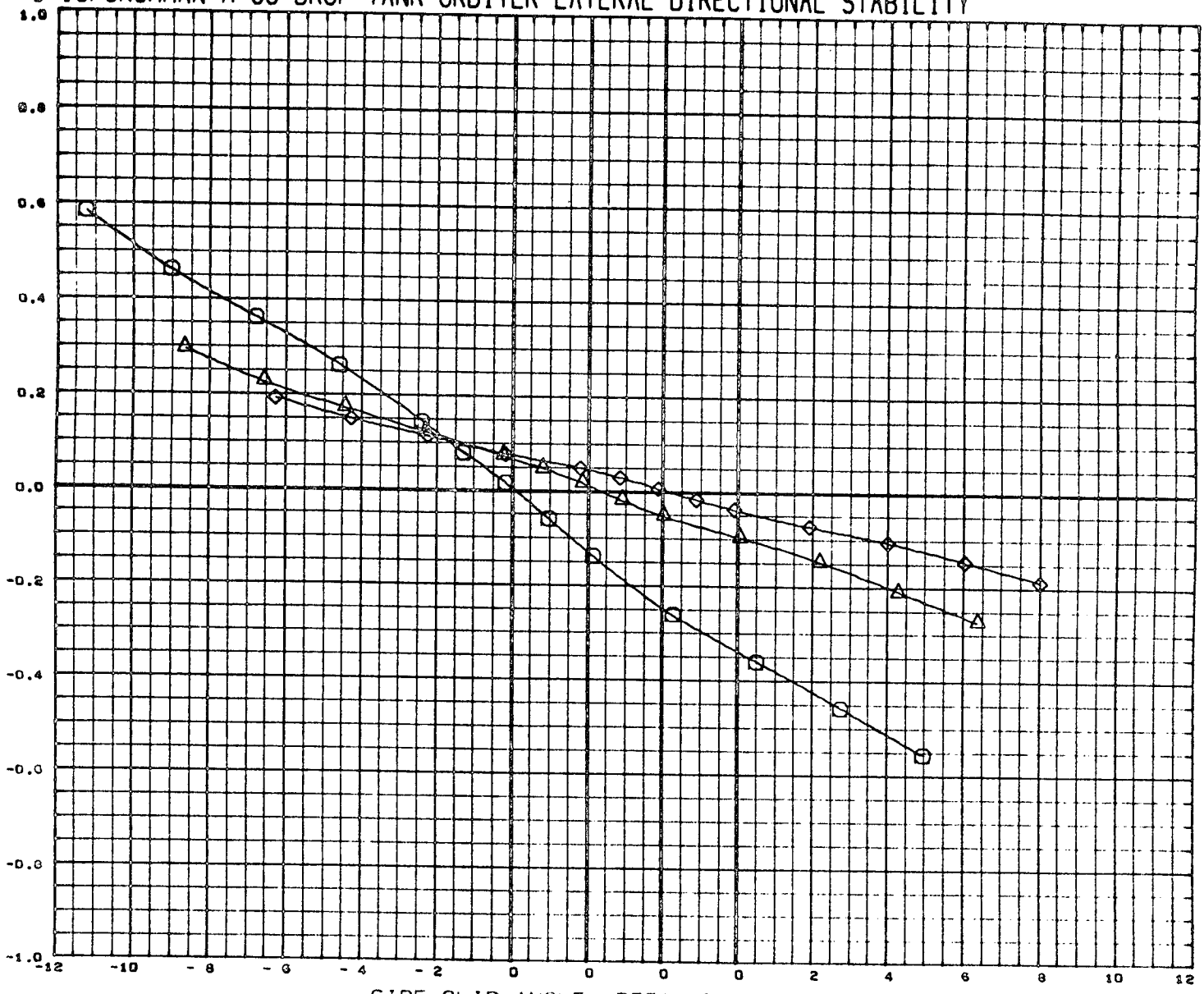
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES		
△	1.964	ALPHA	0.000	PHI	90.000
○	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

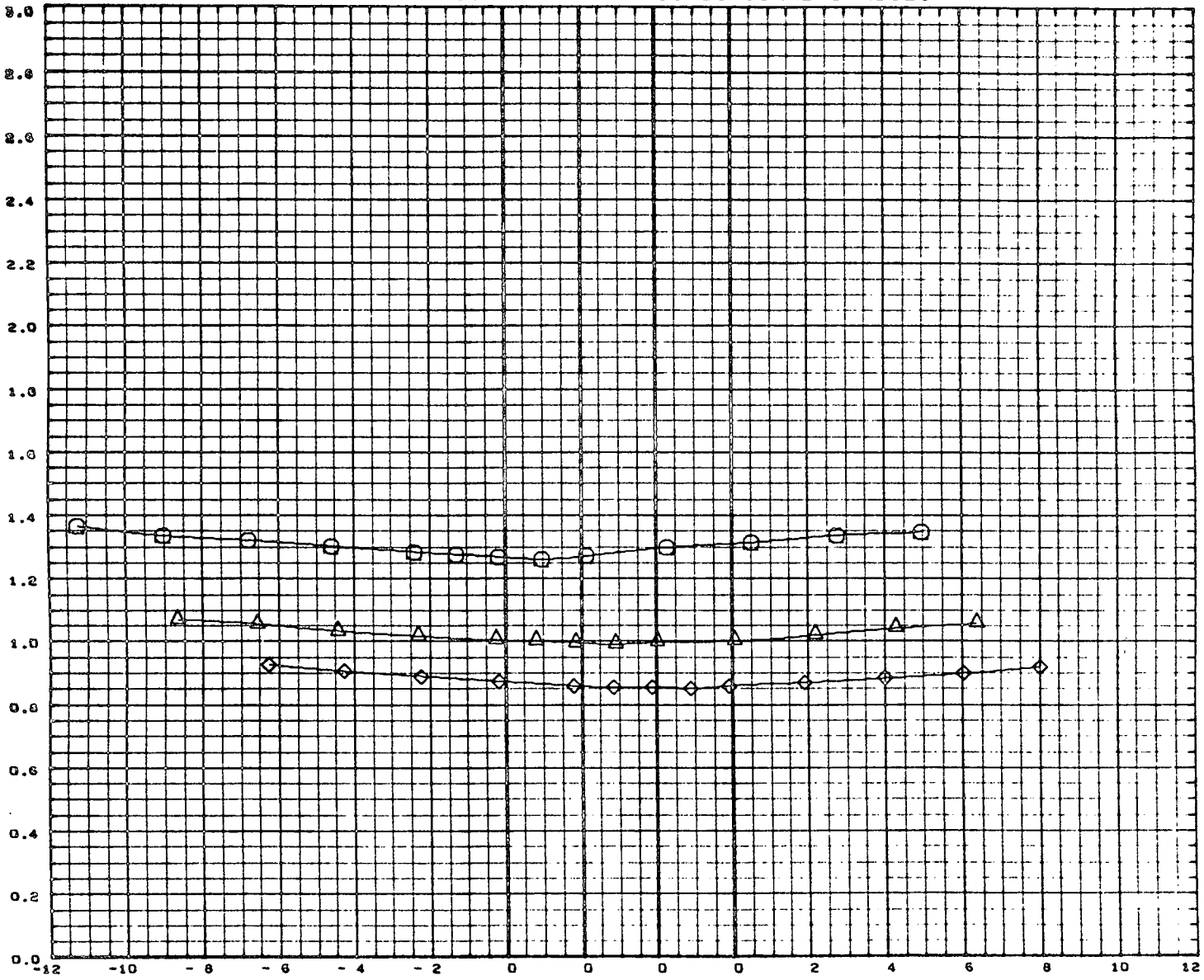
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.596	ALPHA	0.000	PHI	90.000
△	0.903	WNGIN	0.000		
◇	0.997				
□	1.200				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



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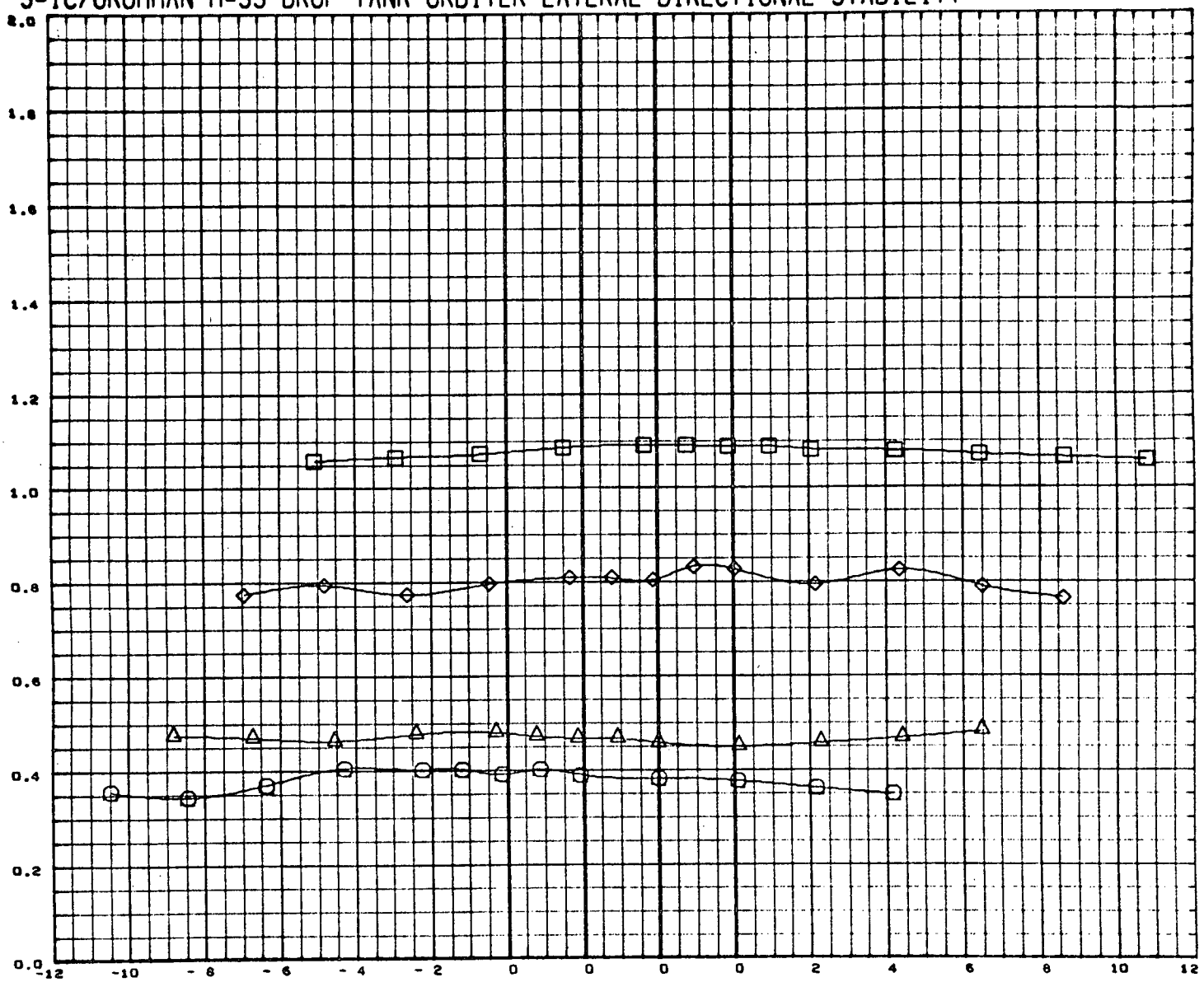
△	3.460	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

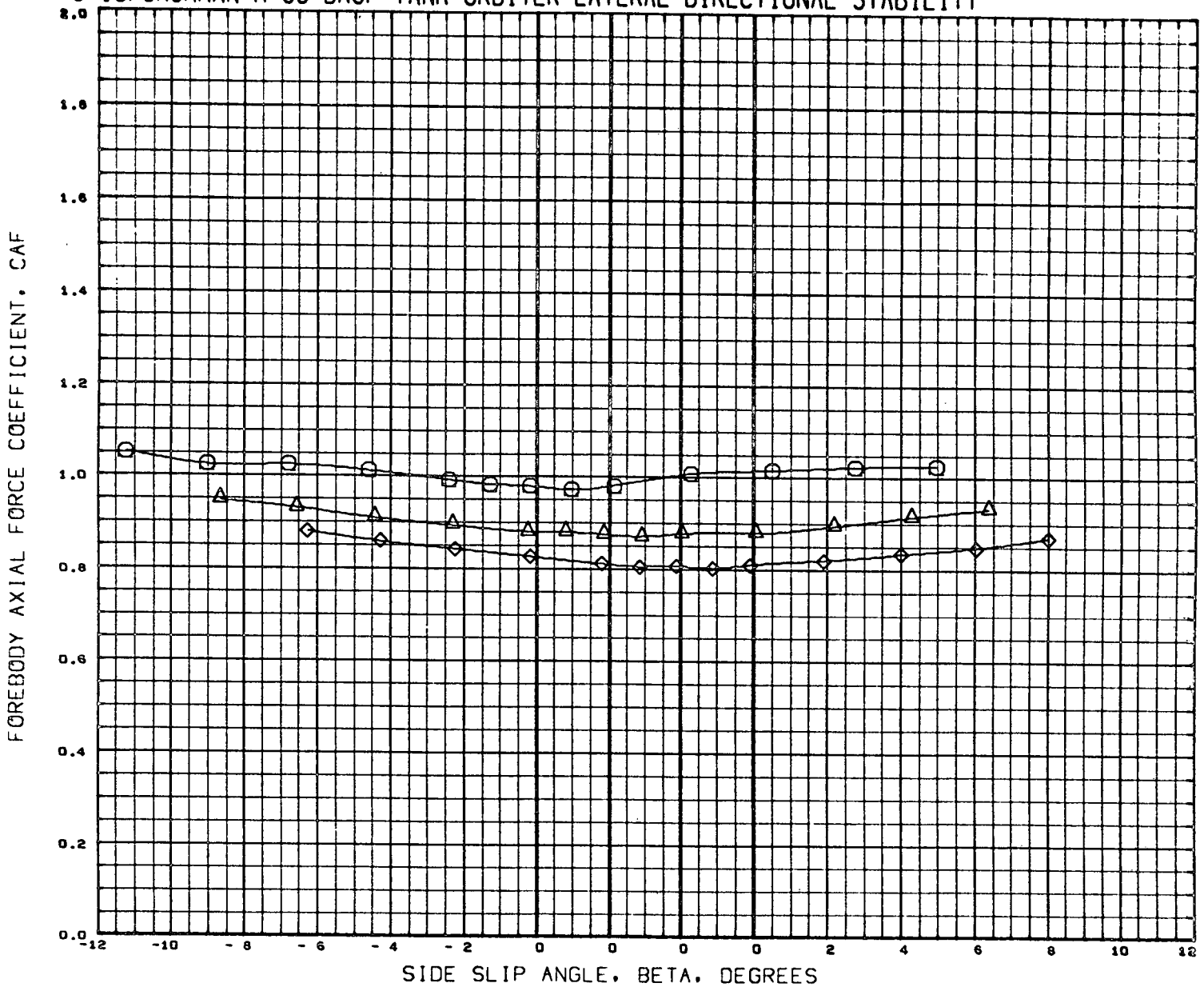


SYMBOL	MACH		PARAMETRIC VALUES		
○	0.596	ALPHA	0.000	PHI	90.000
△	0.903	WNGIN	0.000		
◇	0.997				
□	1.200				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES		
○	1.964	ALPHA	0.000	PHI	90.000
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

SYMBOL	MACH		PARAMETRIC VALUES		
○	0.596	ALPHA	0.000	PHI	90.000
△	0.903	WNGIN	0.000		
◇	0.997				
□	1.200				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

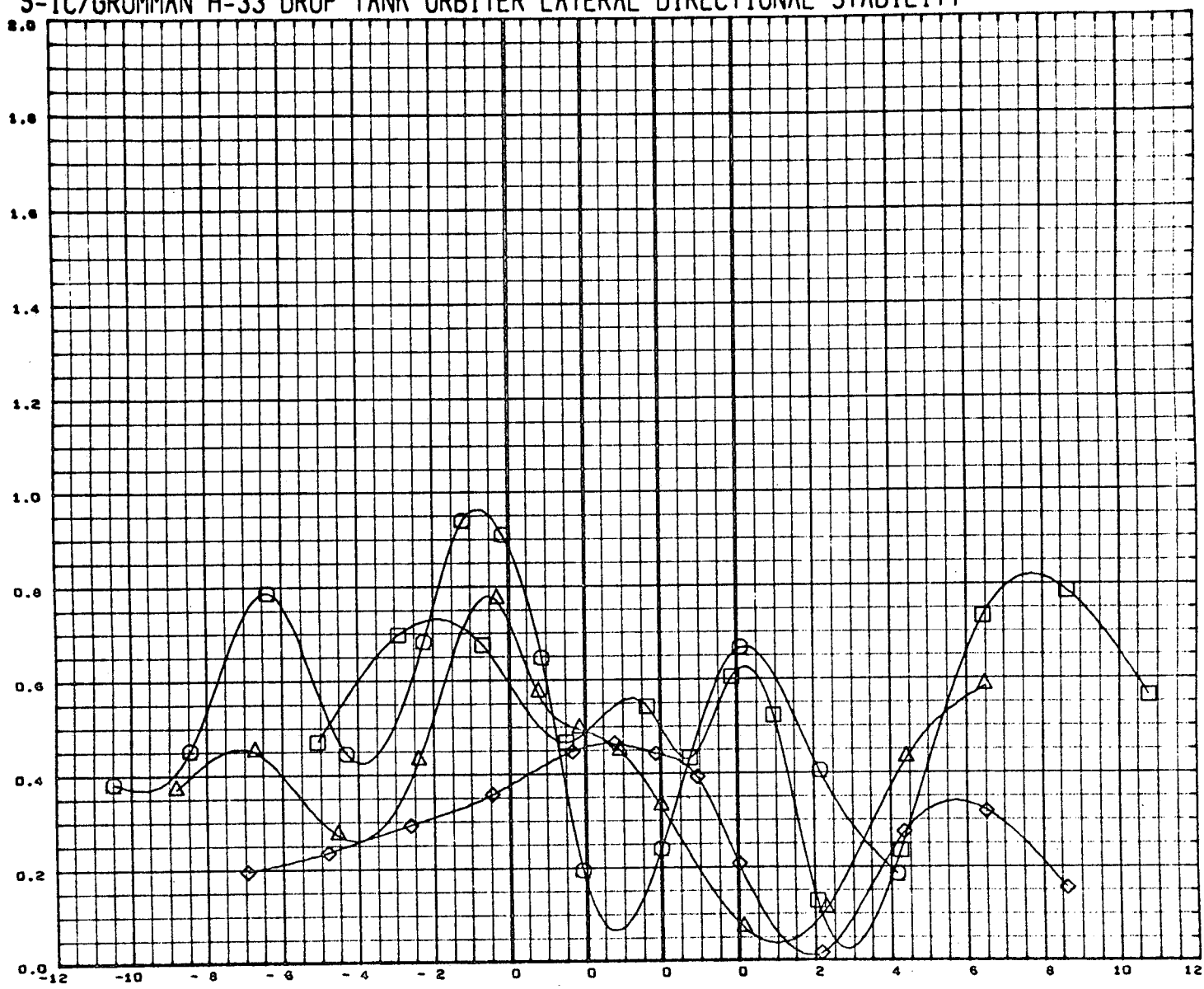
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.964	ALPHA	0.000	PHI	90.000
△	3.480	WNGIN	0.000		
◇	4.950				

DATA MIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



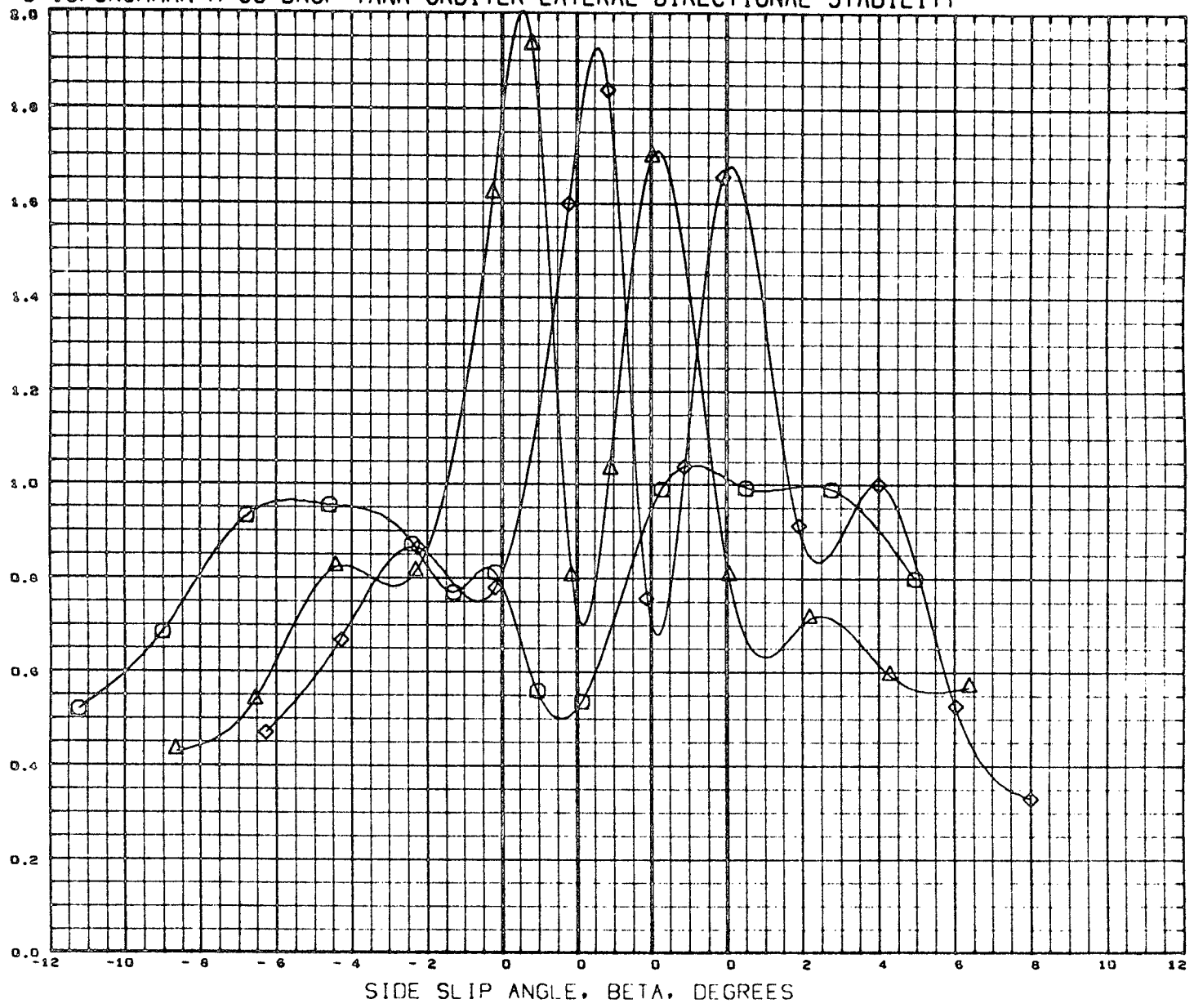
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.596	ALPHA	0.000	PHI	90.000
△	0.903	WNGIN	0.000		
◇	0.997				
□	1.200				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



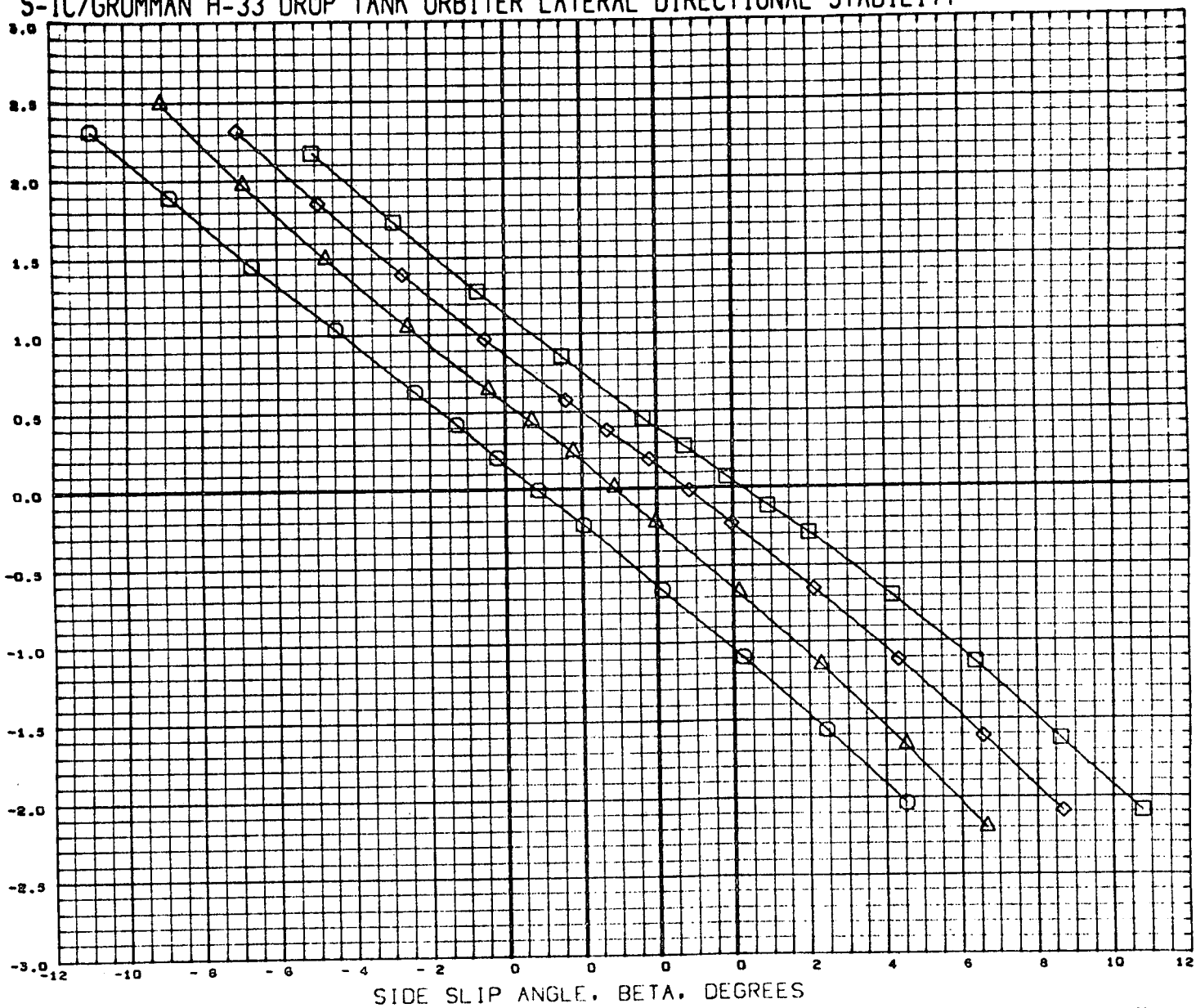
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.964	ALPHA	0.000	PHI	90.000
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-IC/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

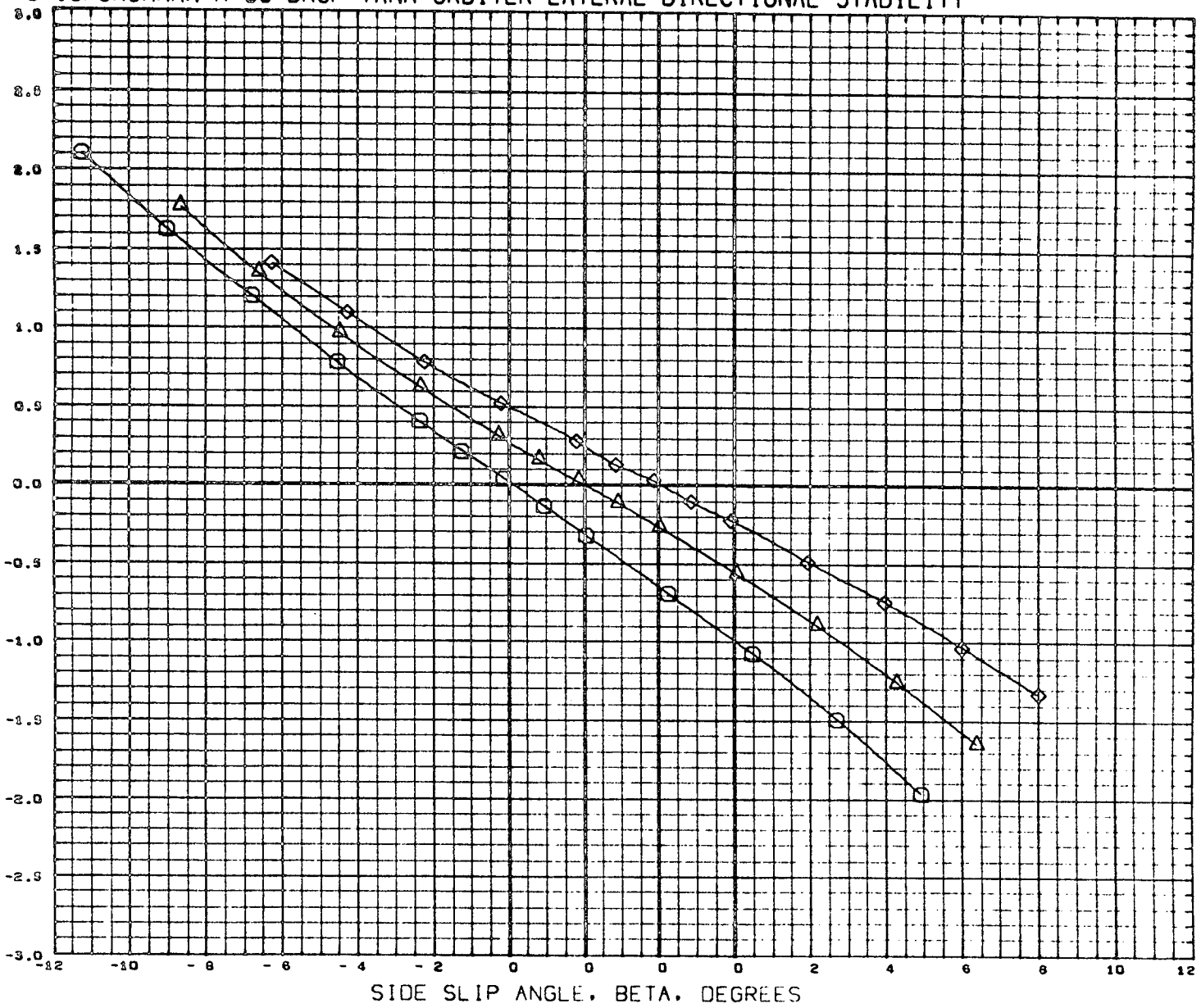


SYMBOL	MACH		PARAMETRIC VALUES		
○	0.901	ALPHA	0.000	PHI	90.000
△	1.004	WNGIN	0.000		
◇	1.102				
□	1.199				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-IC/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES		
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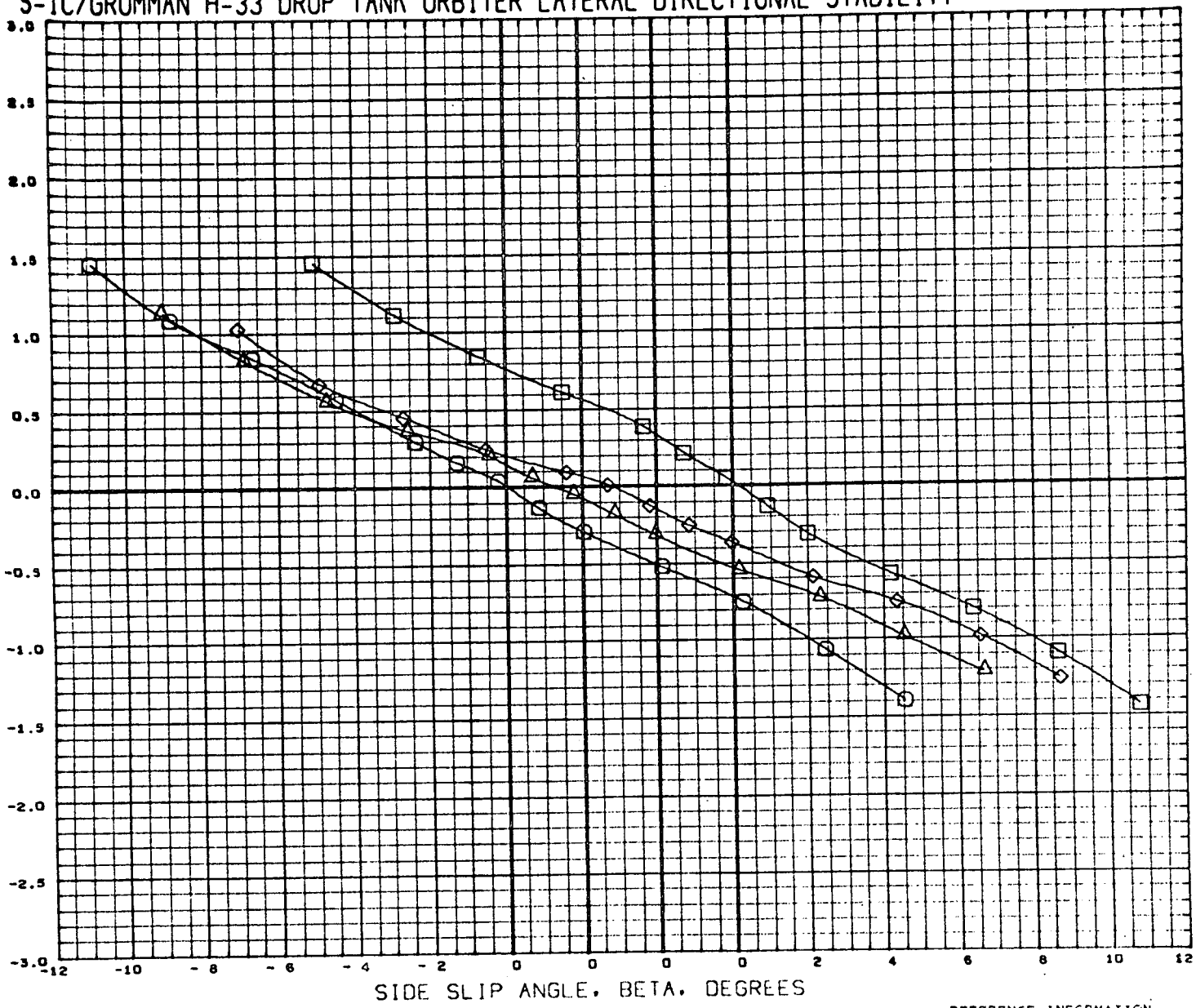
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	0.901
△	1.004
◇	1.102
□	1.199

PARAMETRIC VALUES

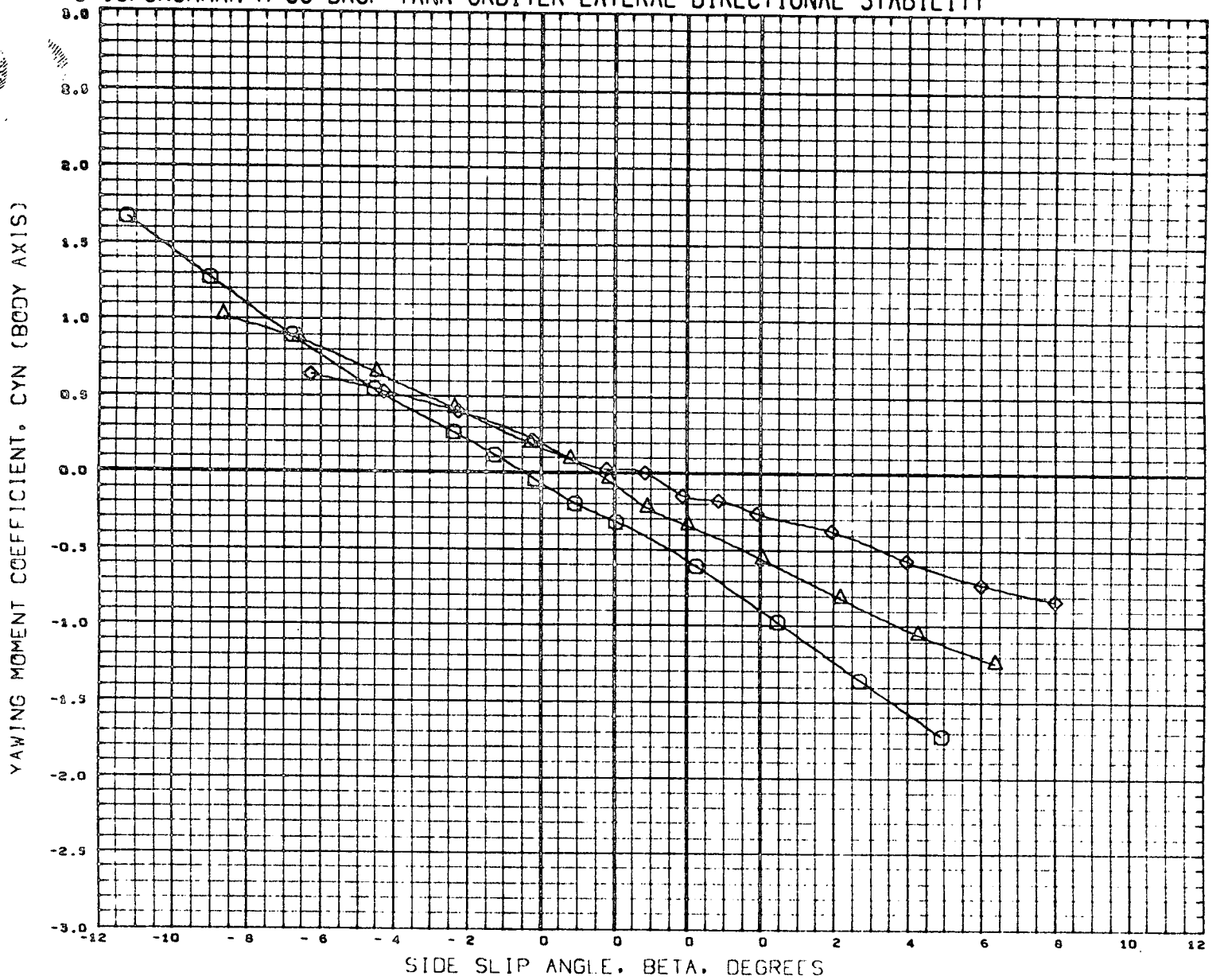
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



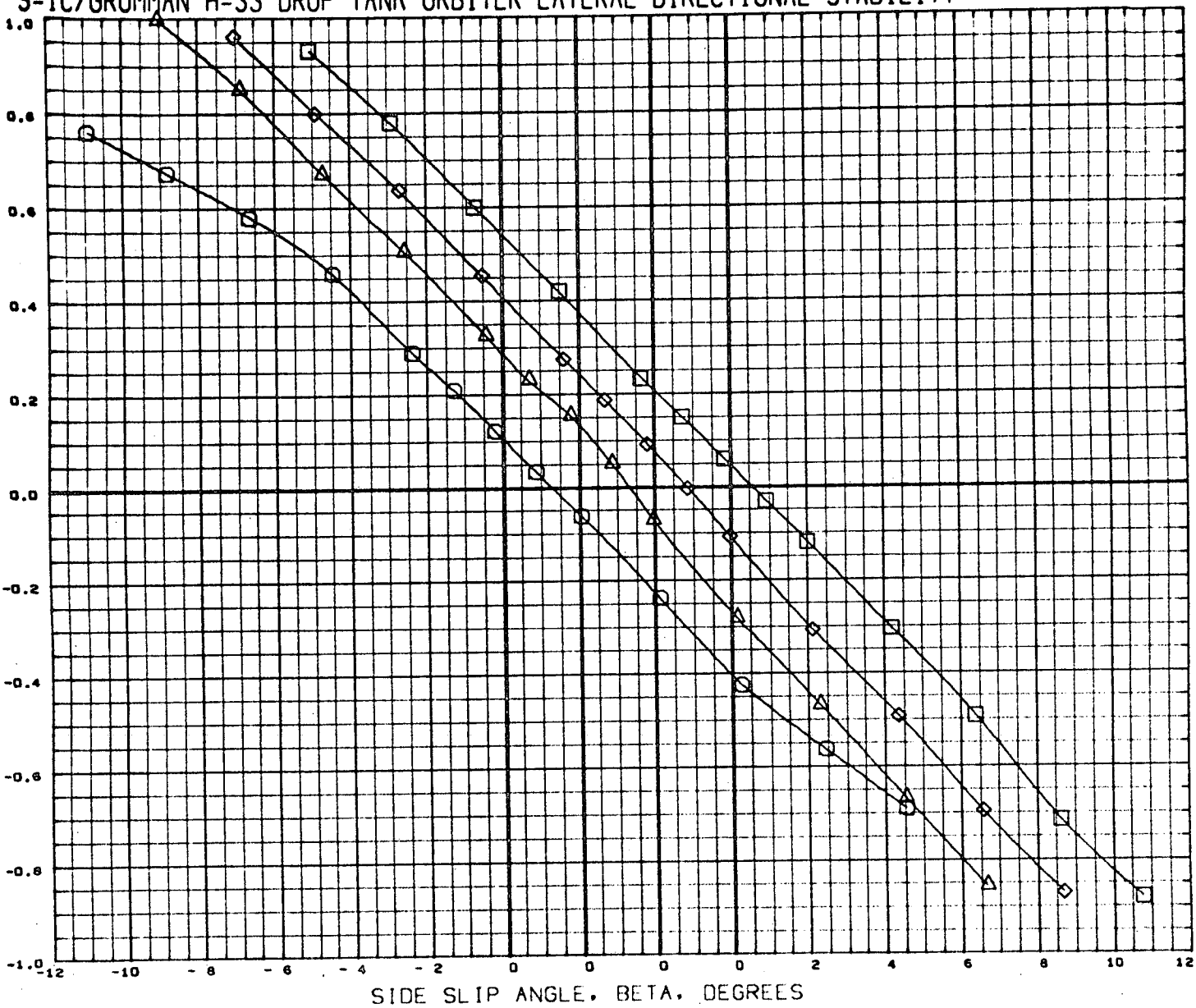
SYMBOL	MACH		PARAMETRIC VALUES		
☆	1.965	ALPHA	0.000	PHI	90.000
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



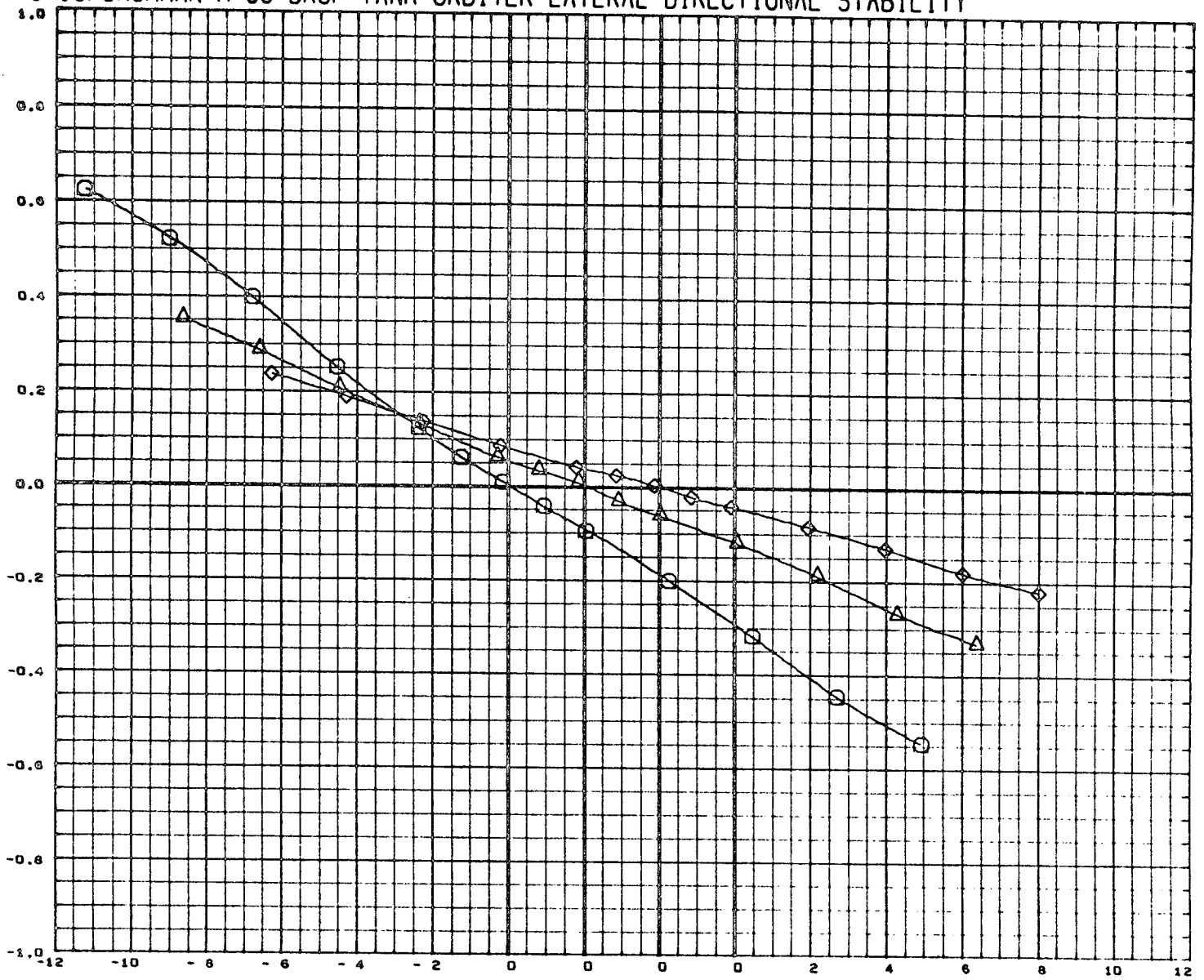
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.901	ALPHA	0.000	PHI	90.000
△	1.004	WNGIN	0.000		
◇	1.102				
□	1.199				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



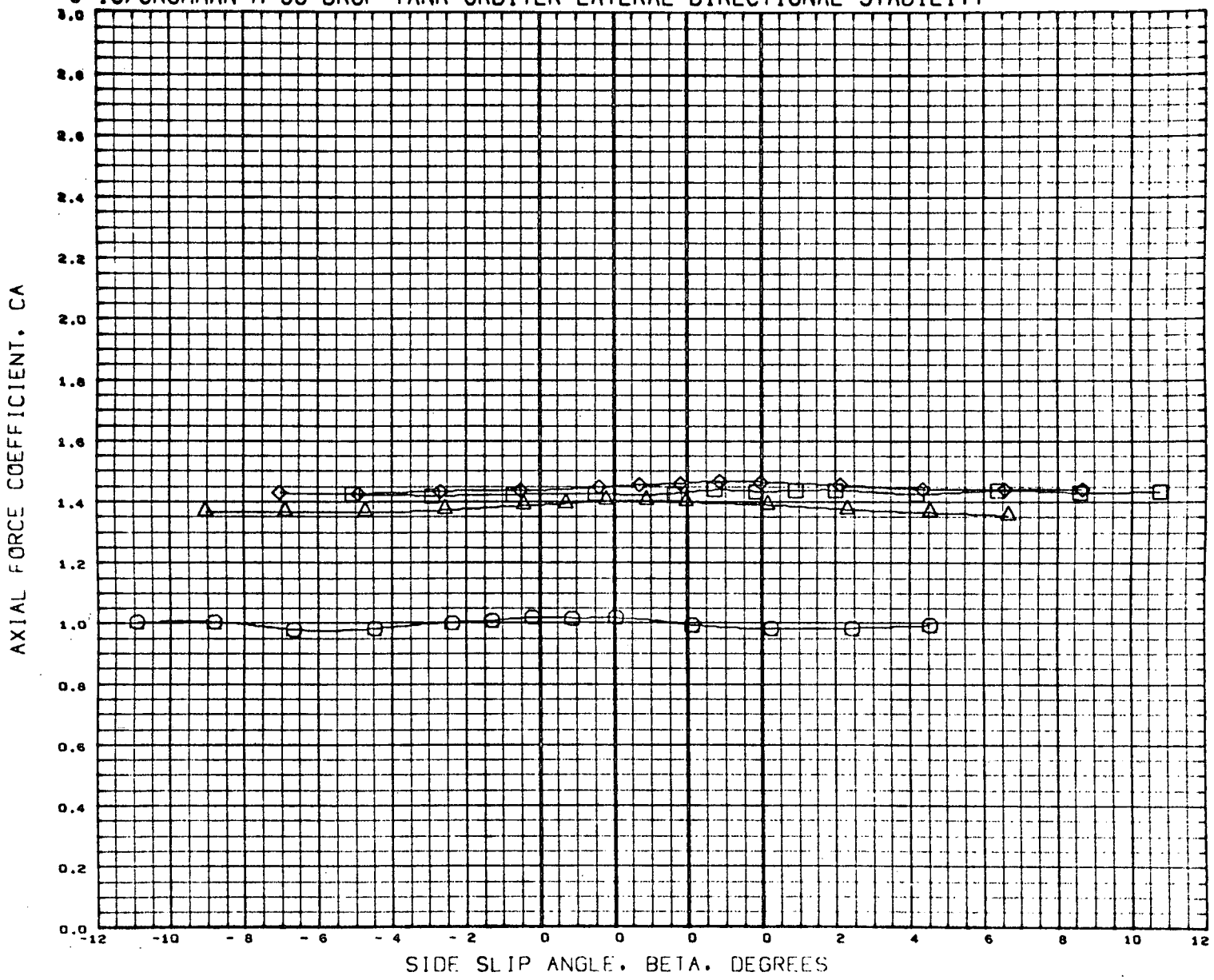
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.965	ALPHA	0.000	PHI	90.000
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	0.901
△	1.004
◇	1.102
□	1.199

PARAMETRIC VALUES

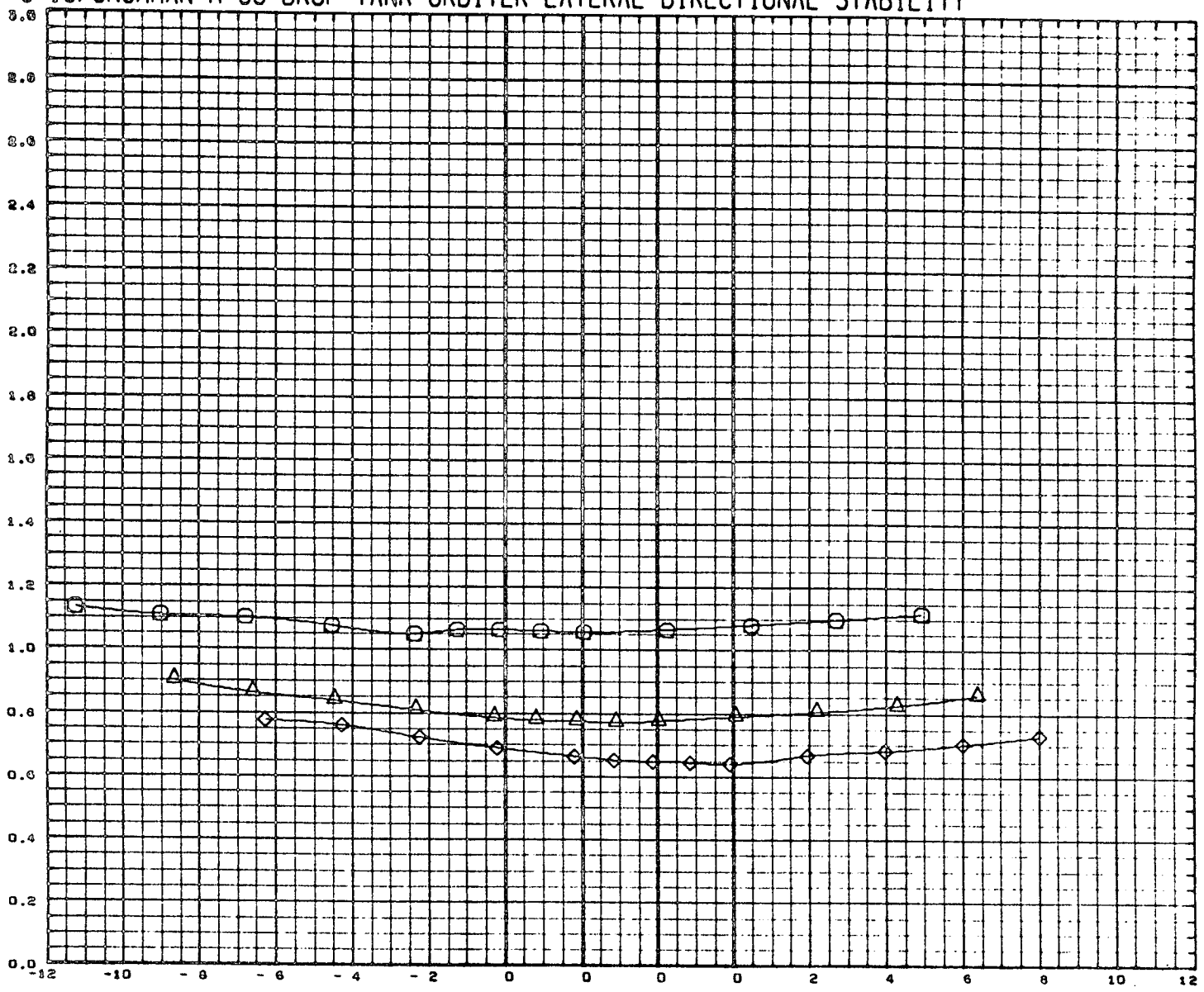
ALPHA	0.000	PHI	90.000	
WIGIN	0.000			

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



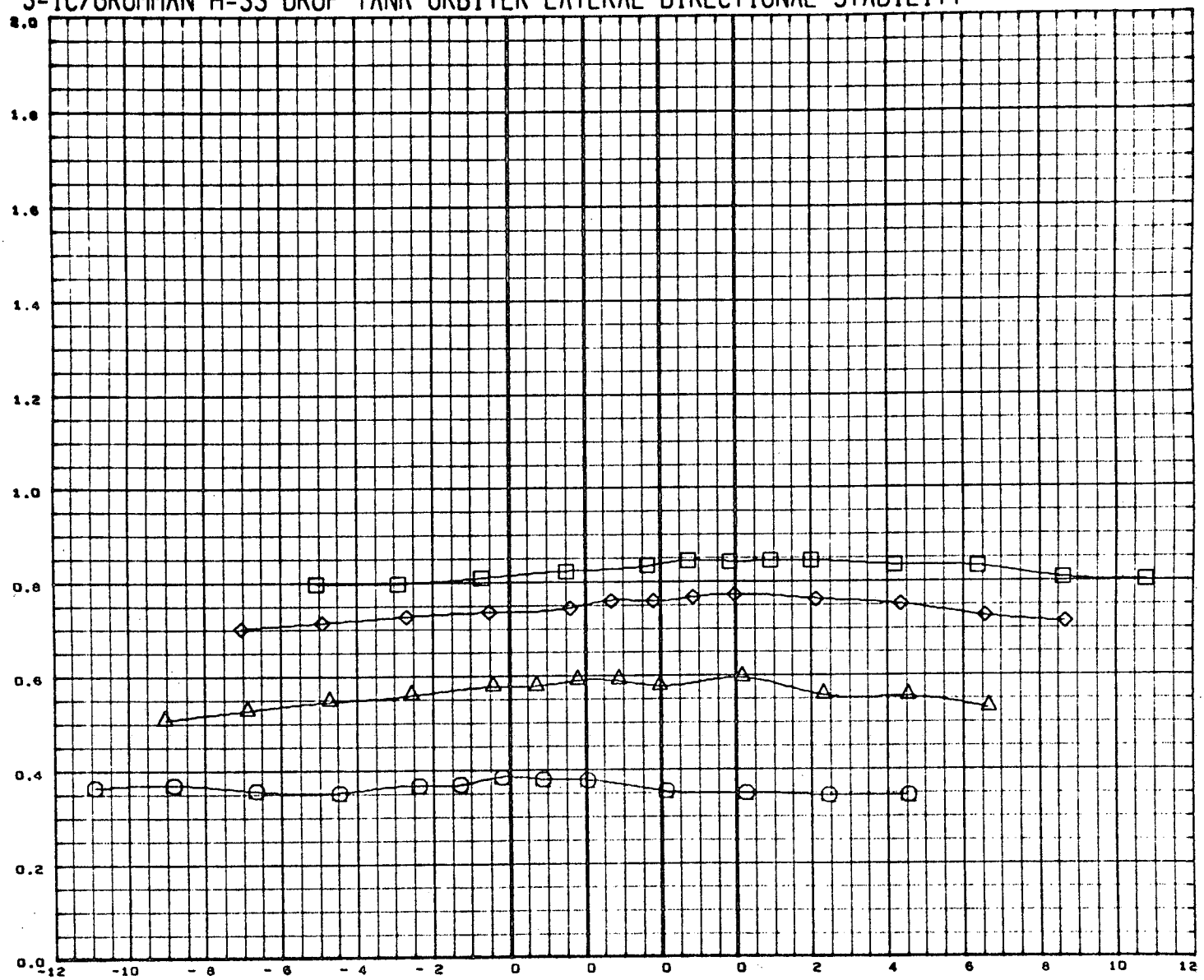
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.965	ALPHA	0.000	PHI	90.000
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



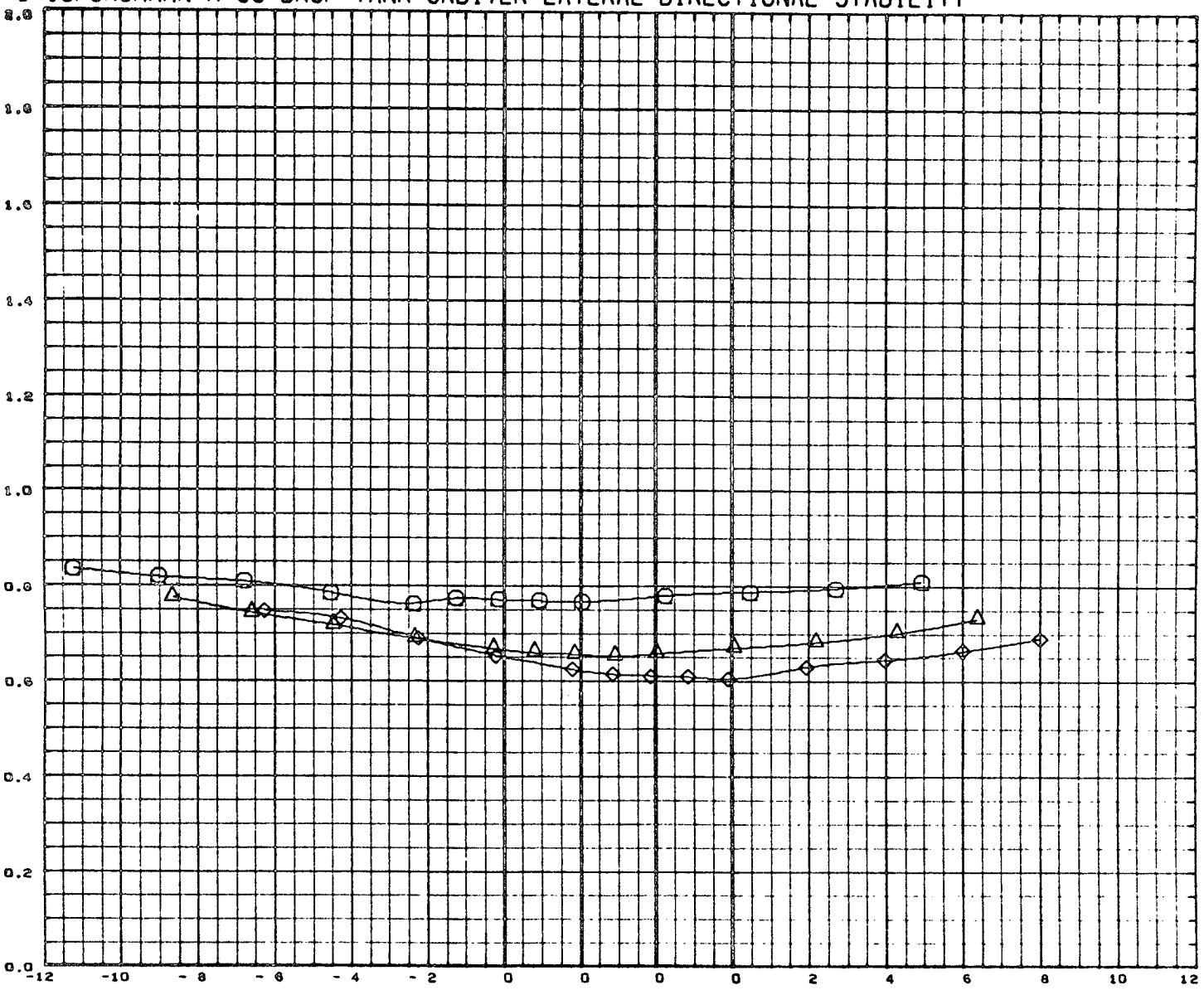
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.901	ALPHA	0.000	PHI	90.000
△	1.004	WNGIN	0.000		
◇	1.102				
□	1.199				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES		
○	1.965	ALPHA	0.000	PHI	90.000
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

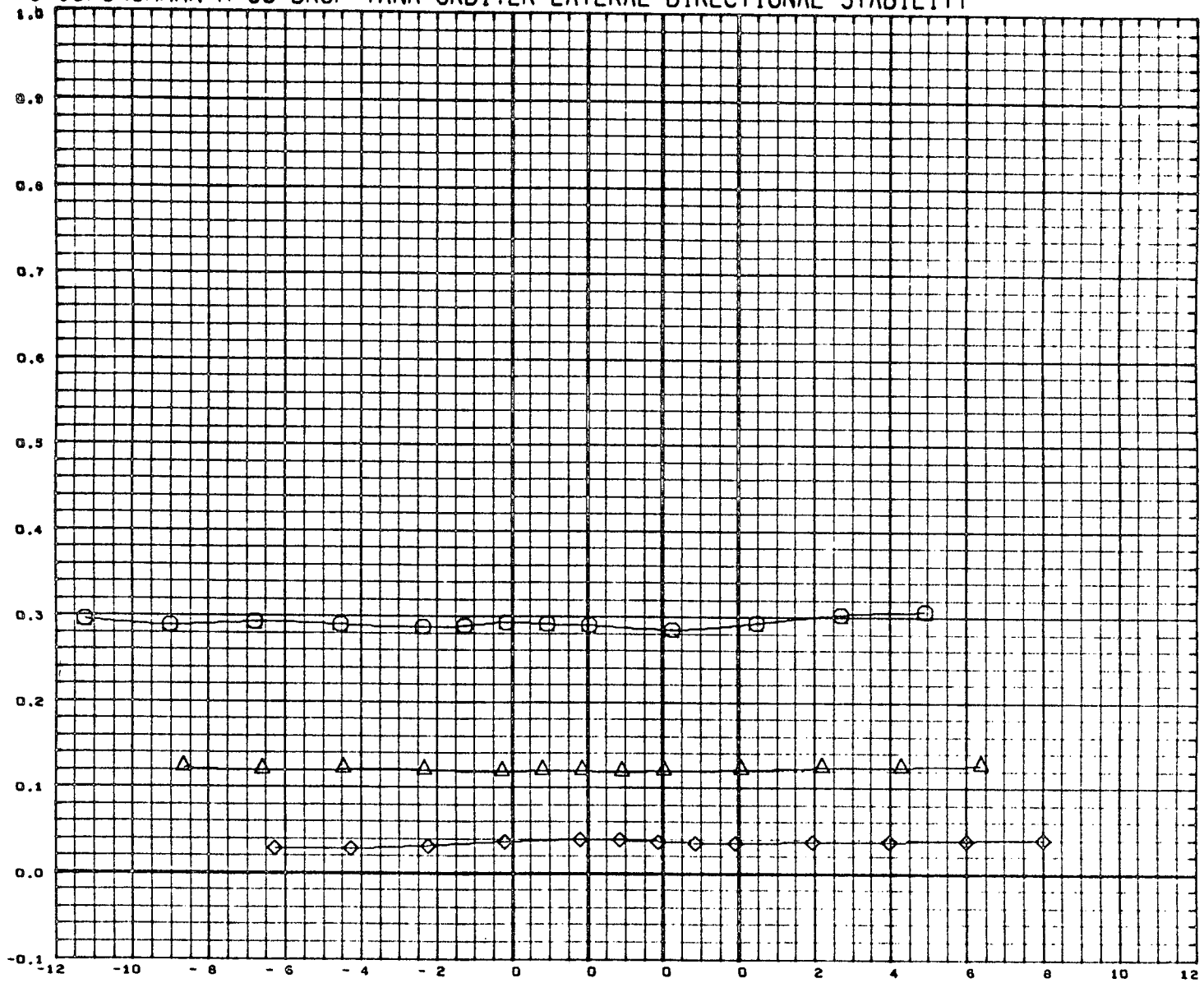
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.901	ALPHA	0.000	PHI	90.000
△	1.004	WNGIN	0.000		
◇	1.102				
□	1.199				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



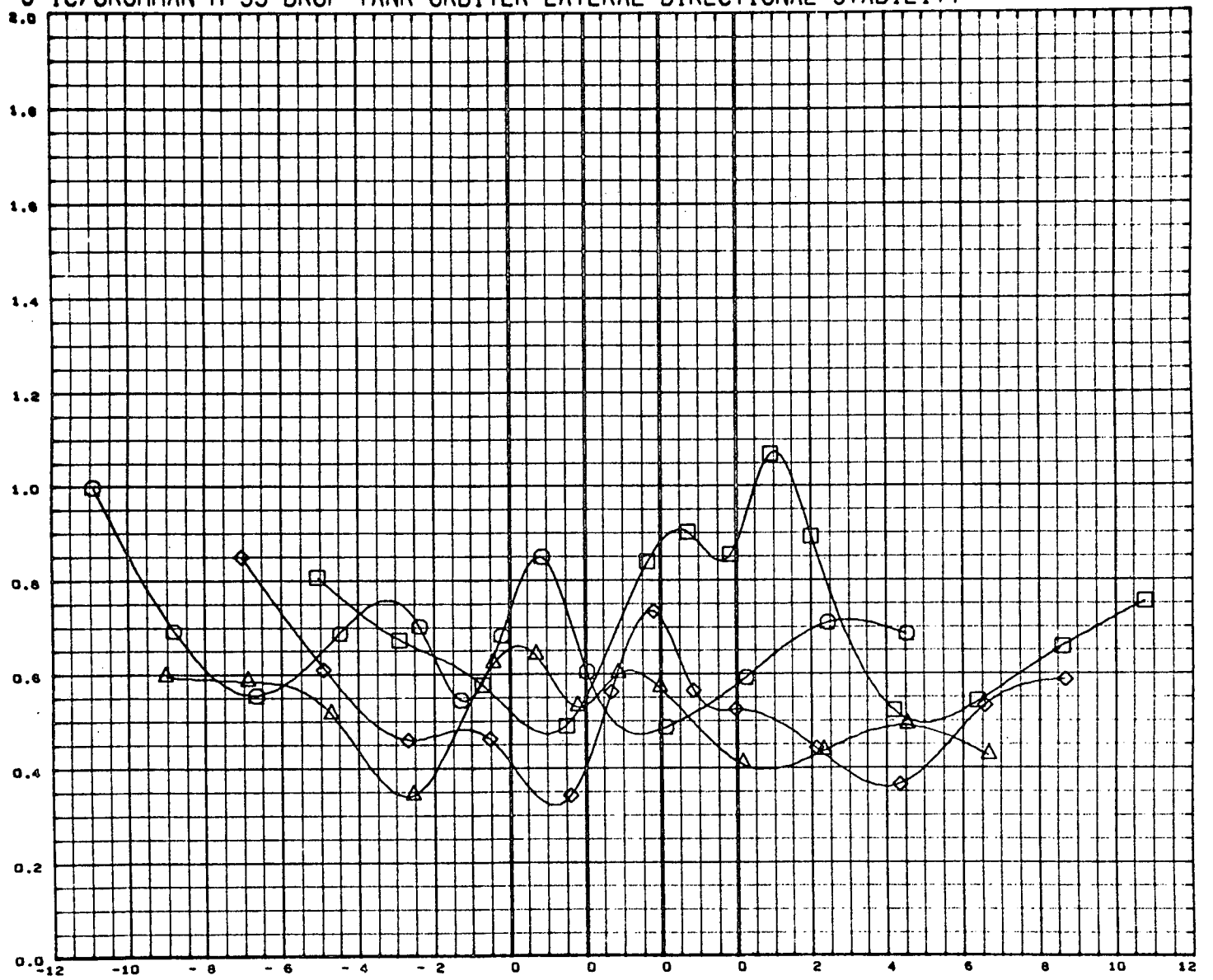
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.965	ALPHA	0.000	PHI	90.000
△	3.480	WNGIN	0.000		
◇	4.959				

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



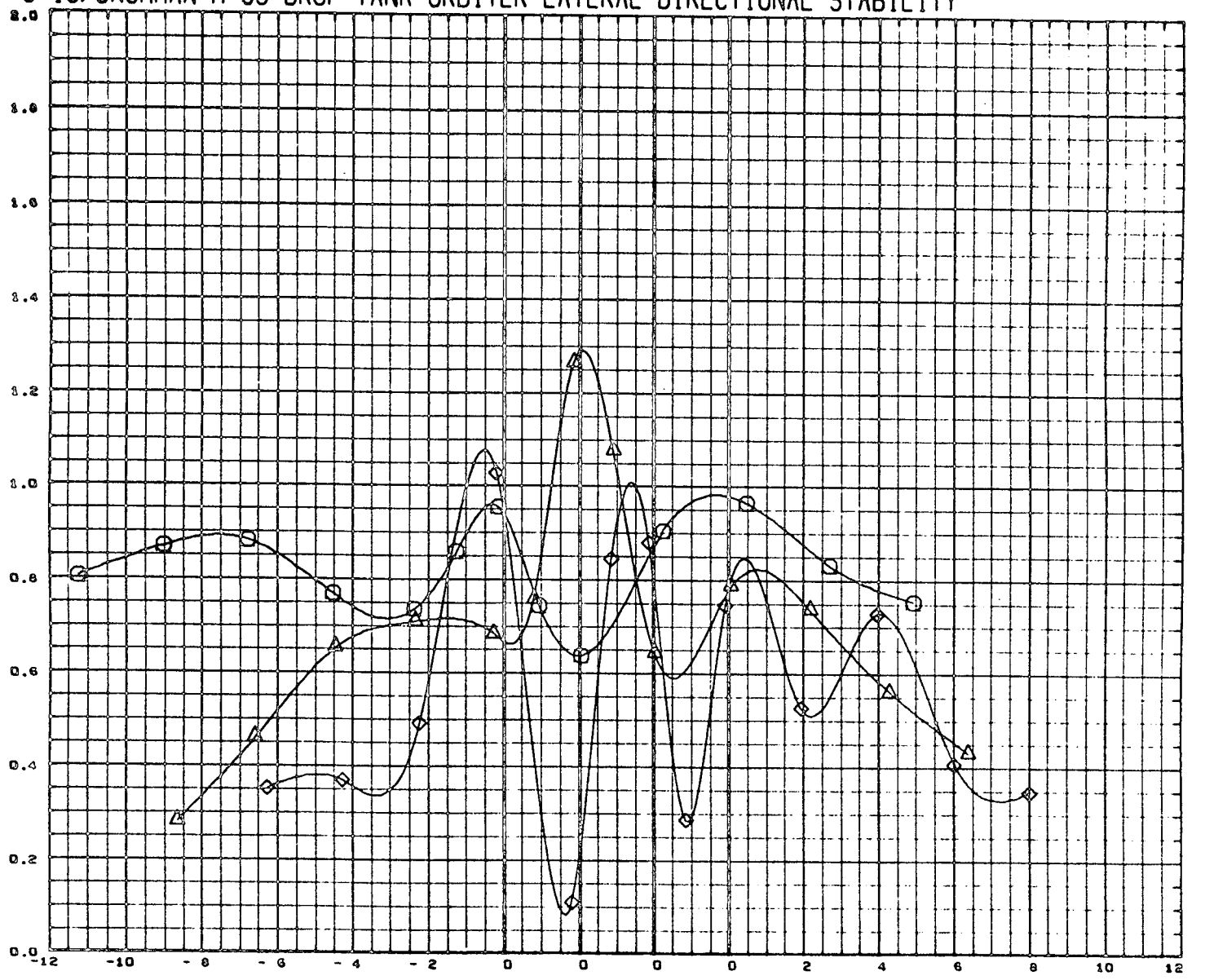
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.901	ALPHA	0.000	PHI	90.000
△	1.004	WNGIN	0.000		
◇	1.102				
□	1.199				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



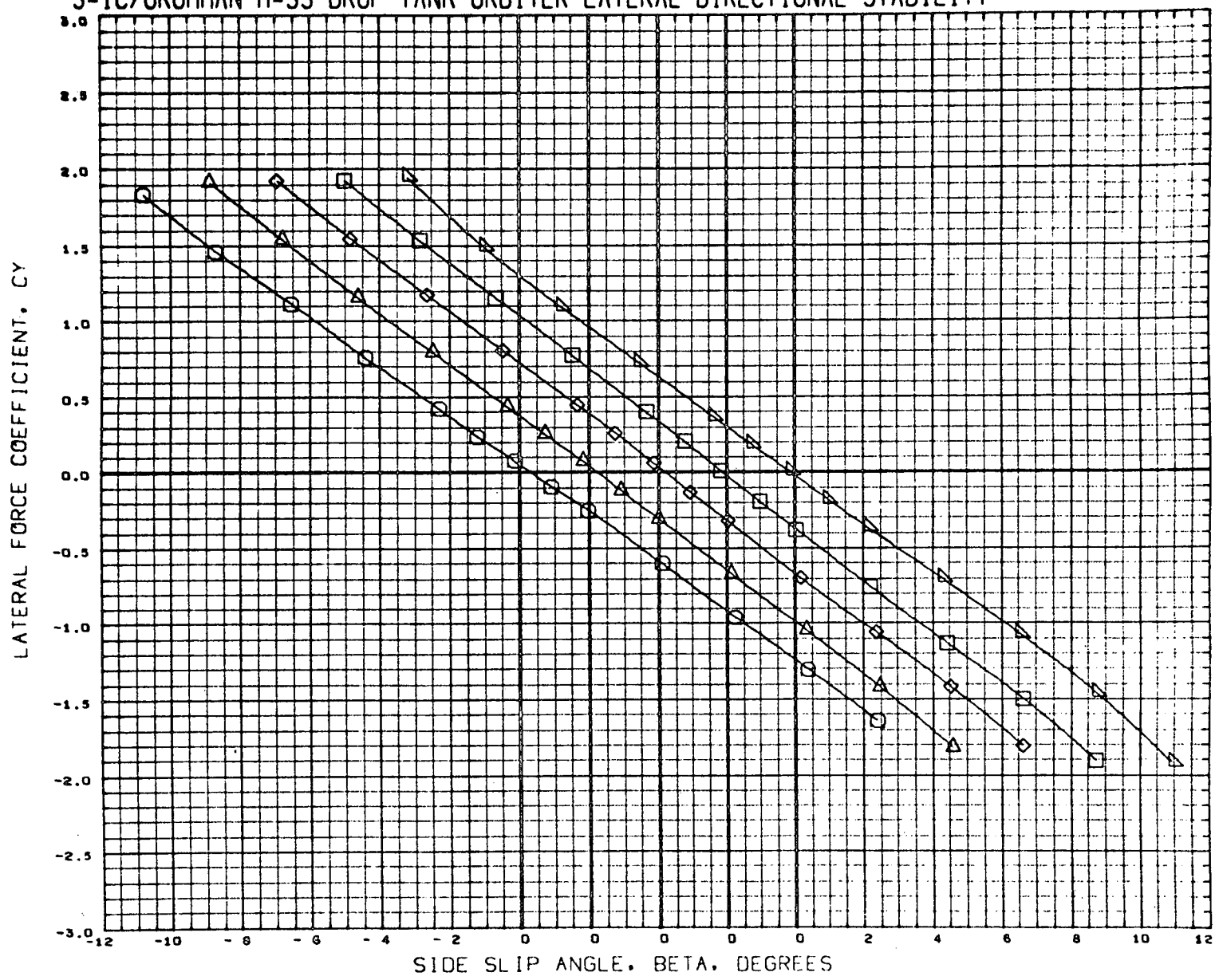
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.965	ALPHA	0.000	PHI	90.000
△	3.480	WNGIN	0.000		
◇	4.999				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	0.899
△	1.006
◇	1.092
□	1.196
▷	1.963

PARAMETRIC VALUES

ALPHA 0.000 PHI 90.000

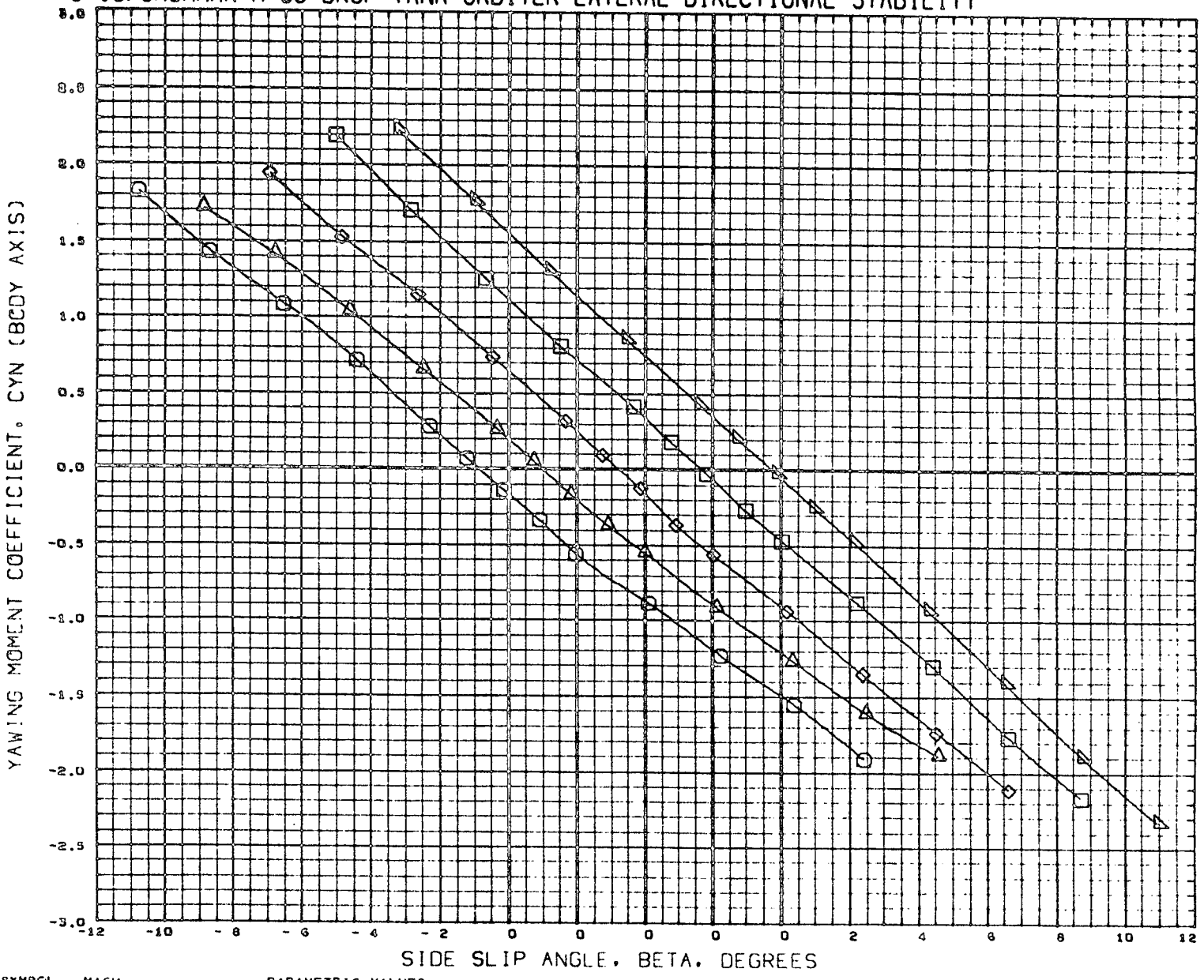
WNGIN 0.000

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



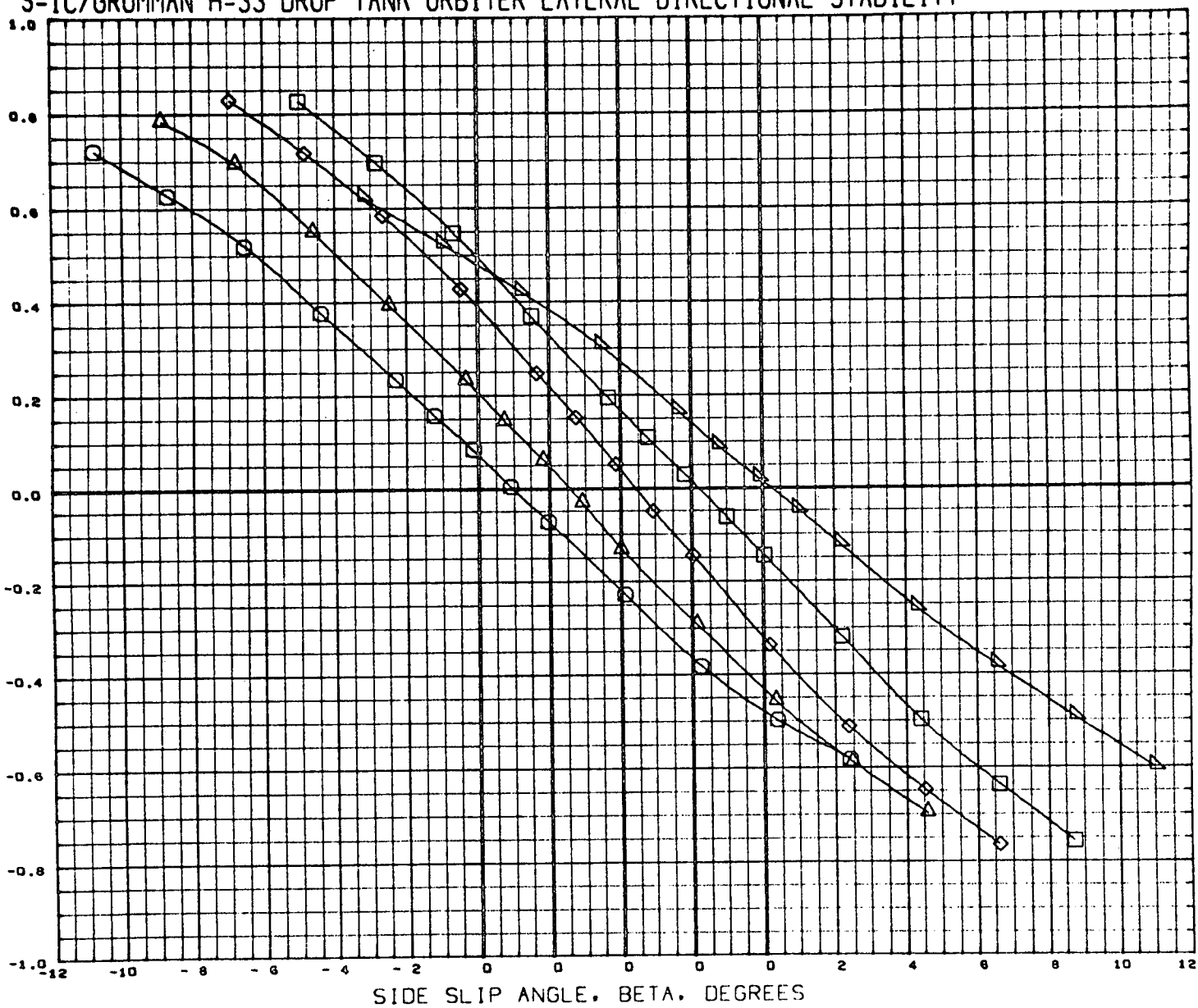
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.899	ALPHA	0.000	PHI	90.000
△	1.006	WNGIN	0.000		
◇	1.092				
□	1.190				
▽	1.963				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL MACH

◇	0.899
□	1.006
△	1.092
○	1.196
▽	1.963

PARAMETRIC VALUES

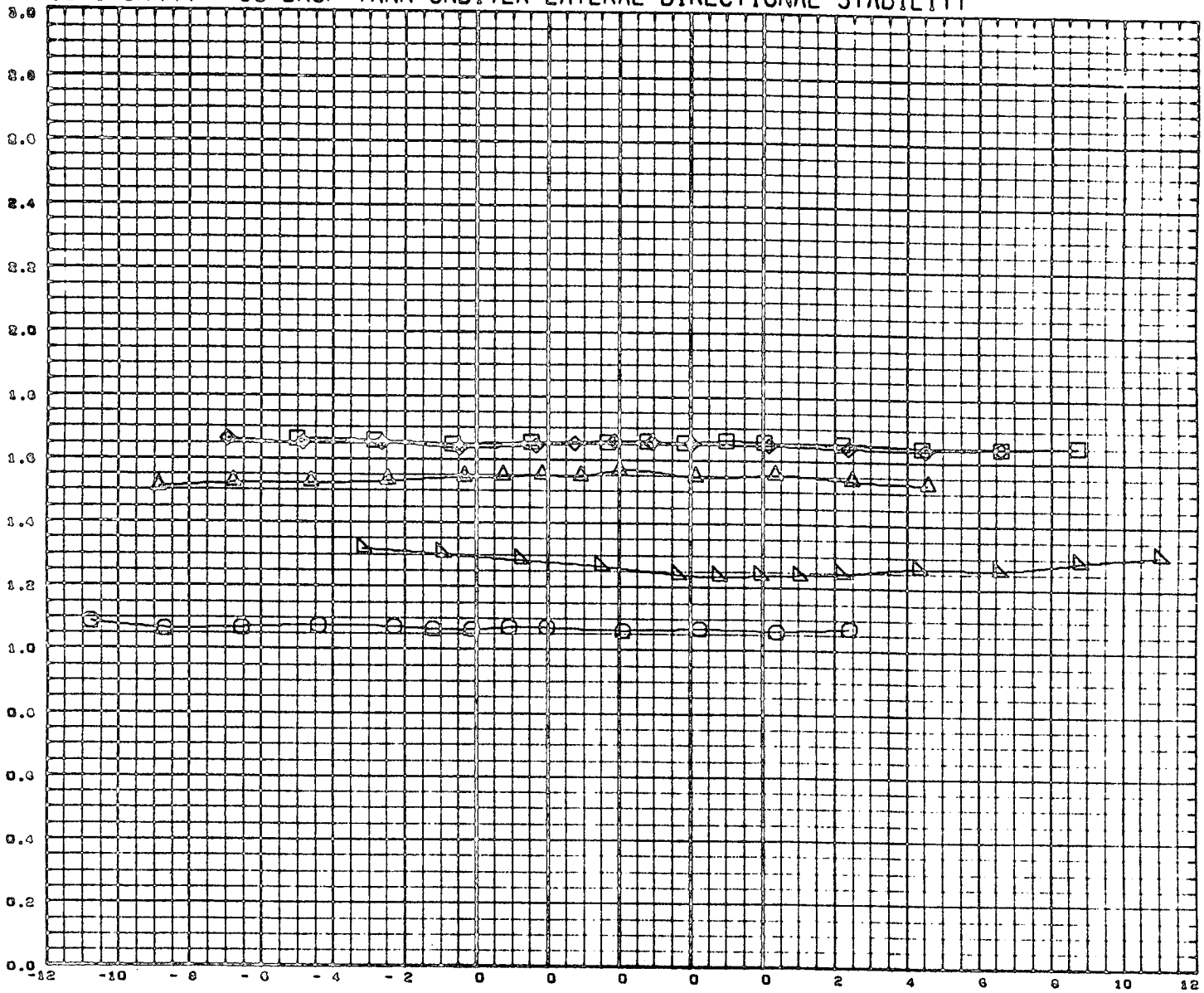
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



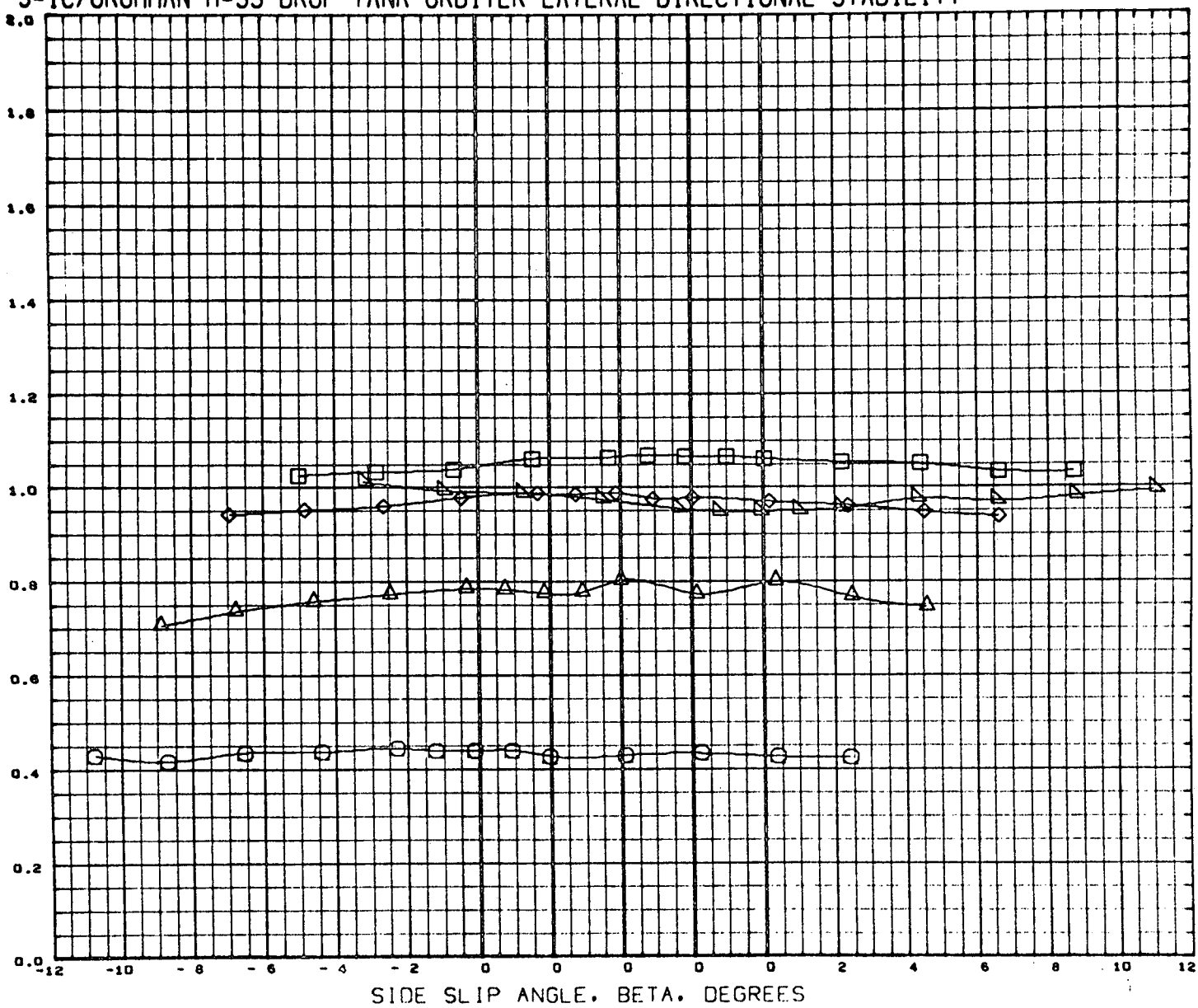
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.999	ALPHA	0.000	PHI	90.000
△	1.000	WNGIN	0.000		
◇	1.092				
□	1.190				
▽	1.963				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	0.899
△	1.006
◇	1.092
□	1.196
⊠	1.963

PARAMETRIC VALUES

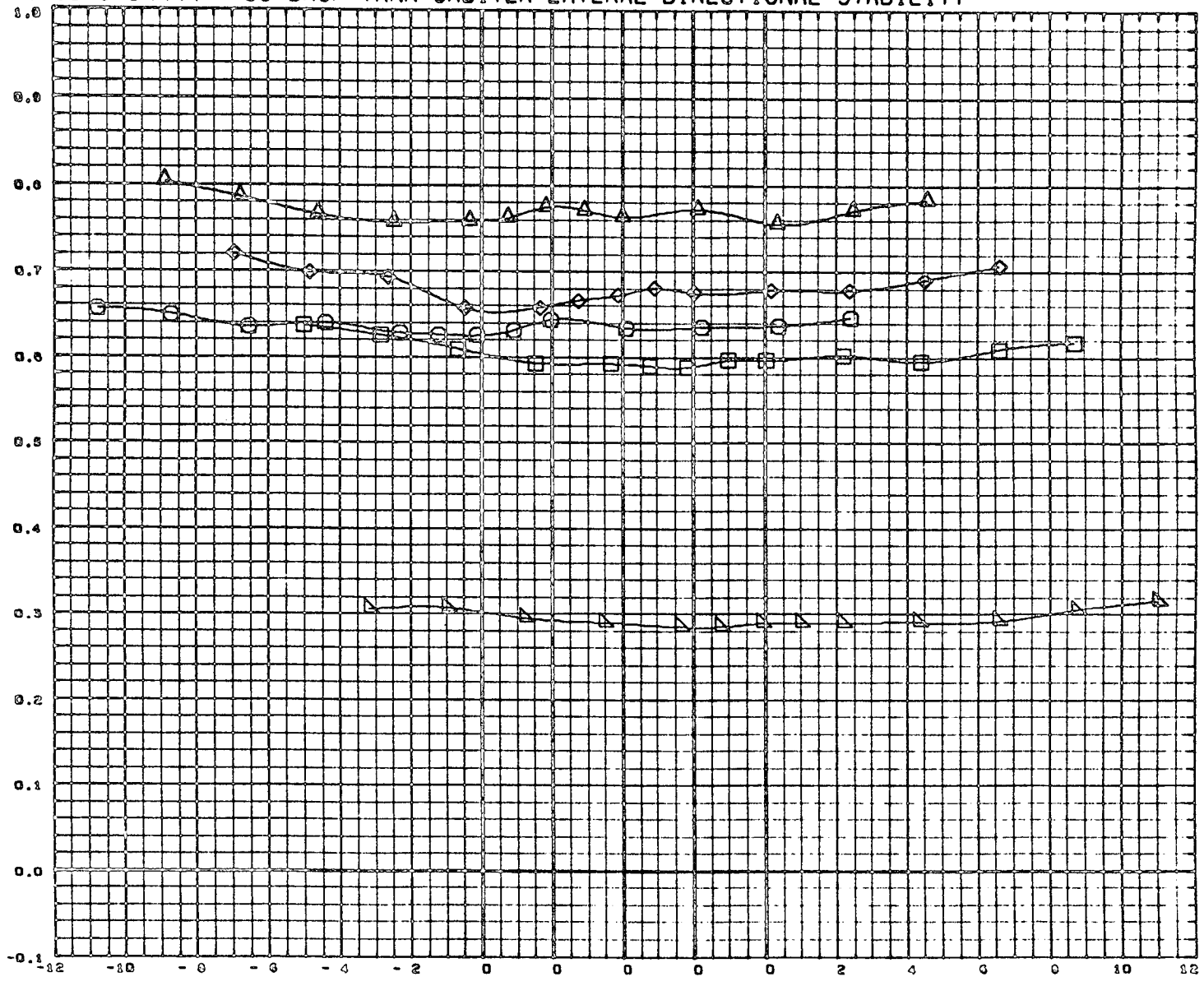
ALPHA	0.000	PHI	90.000	
WNGIN	0.000			

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
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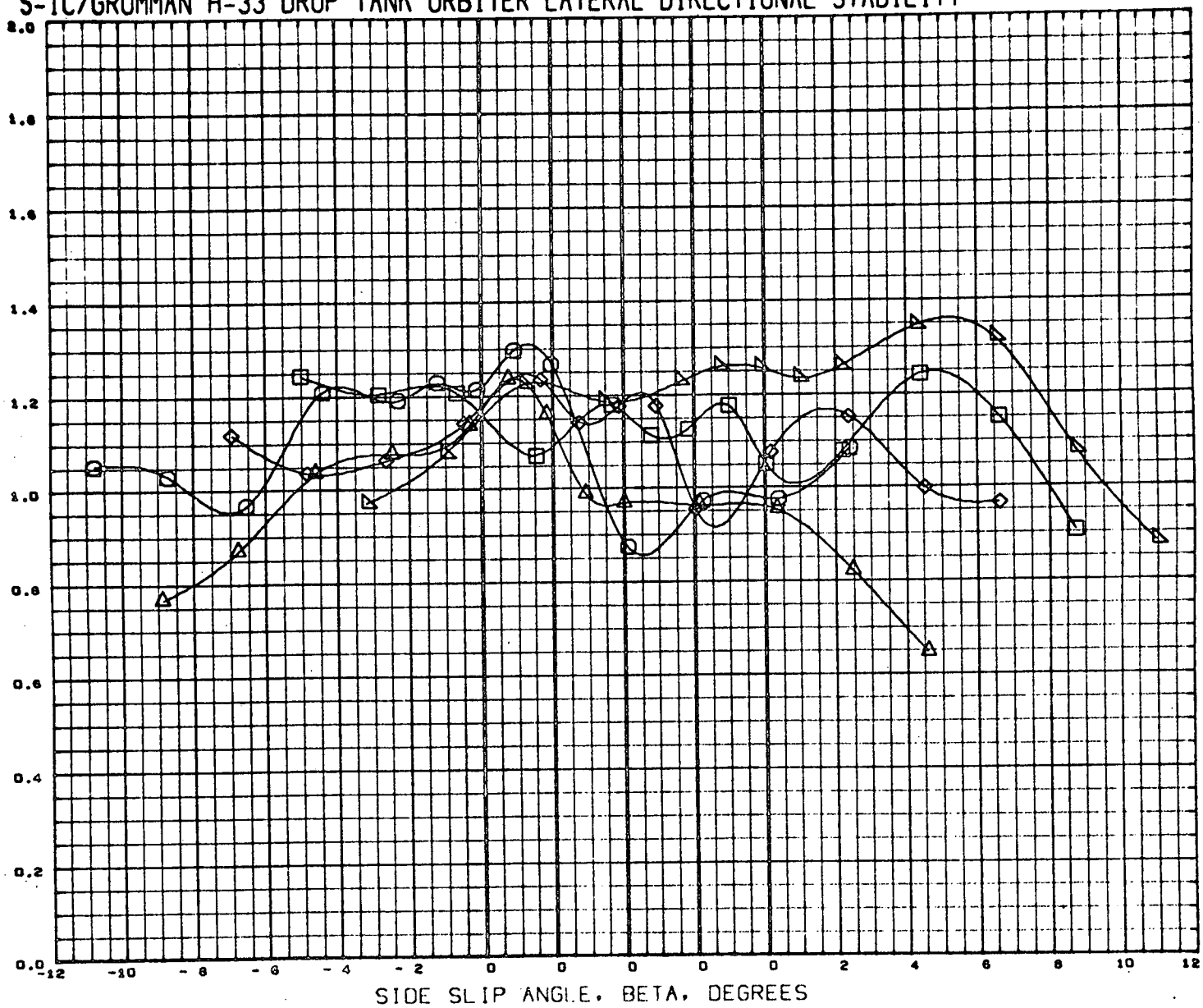
△	1.006	WNGIN	0.000		
◇	1.092				
□	1.190				
▽	1.603				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
▽	0.899
□	1.006
◇	1.092
△	1.196
○	1.963

PARAMETRIC VALUES

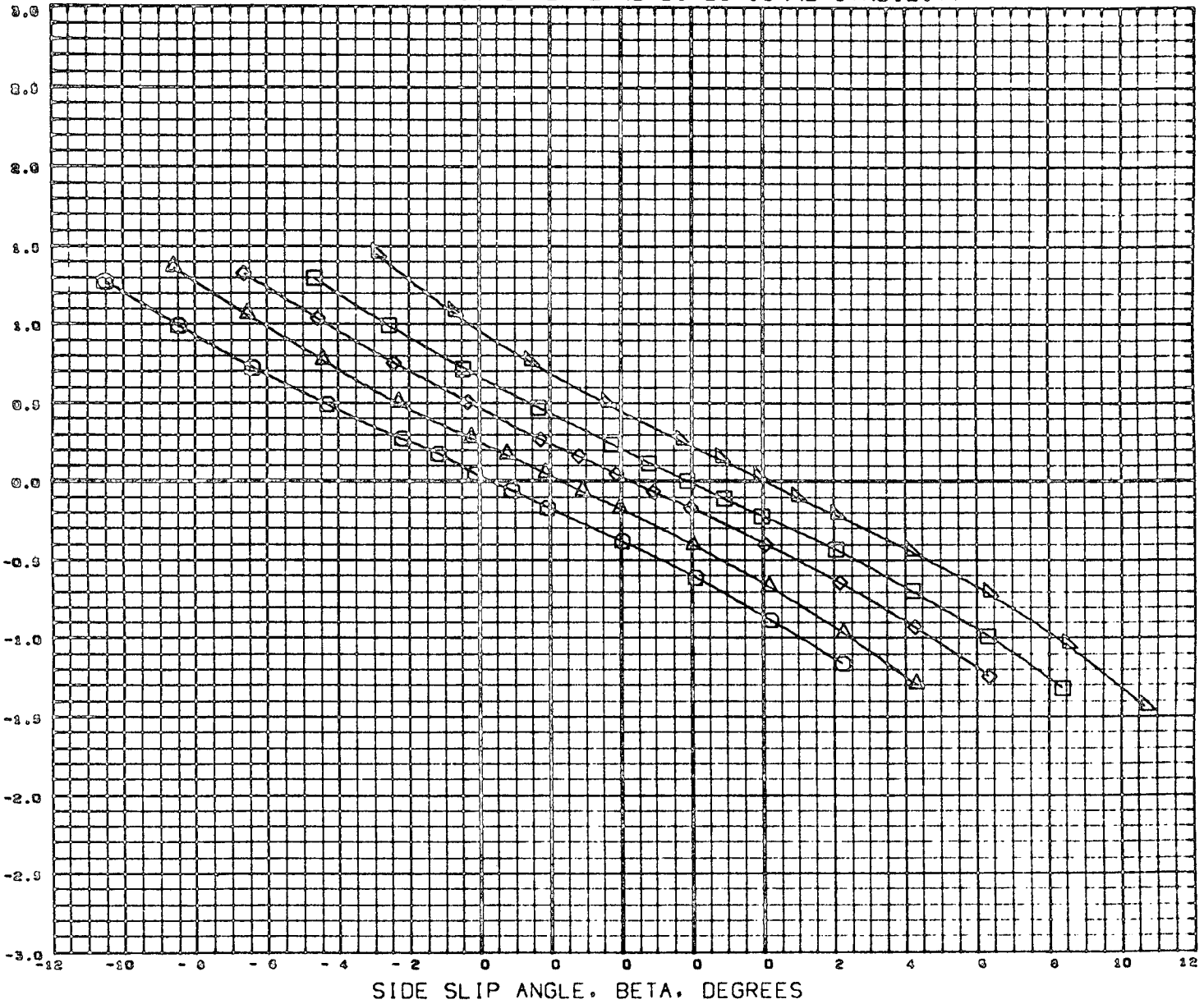
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



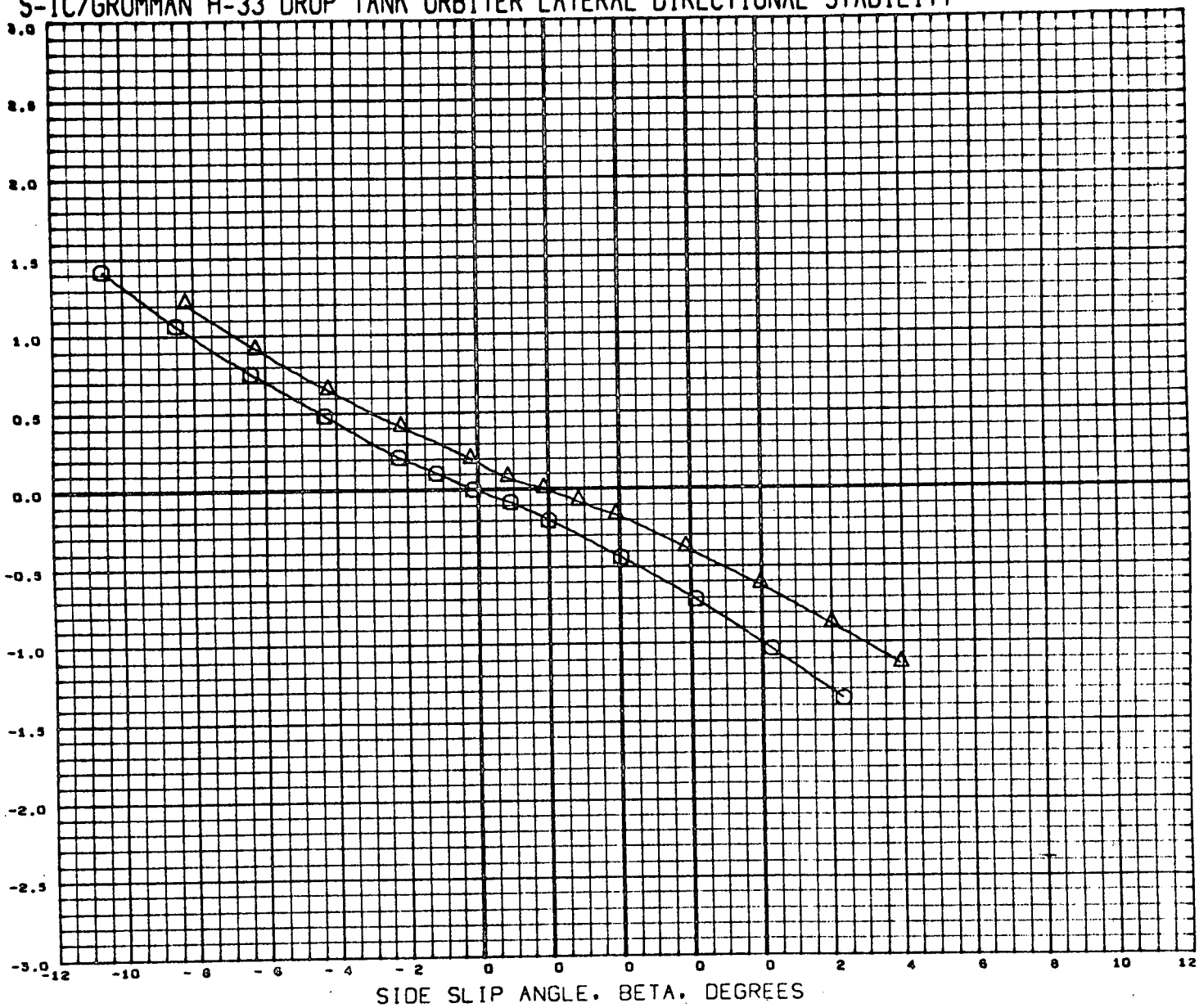
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.605	ALPHA	0.000	PHI	90.000
△	0.897	WNGIN	0.000		
◇	1.202				
□	1.203				
	1.000				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



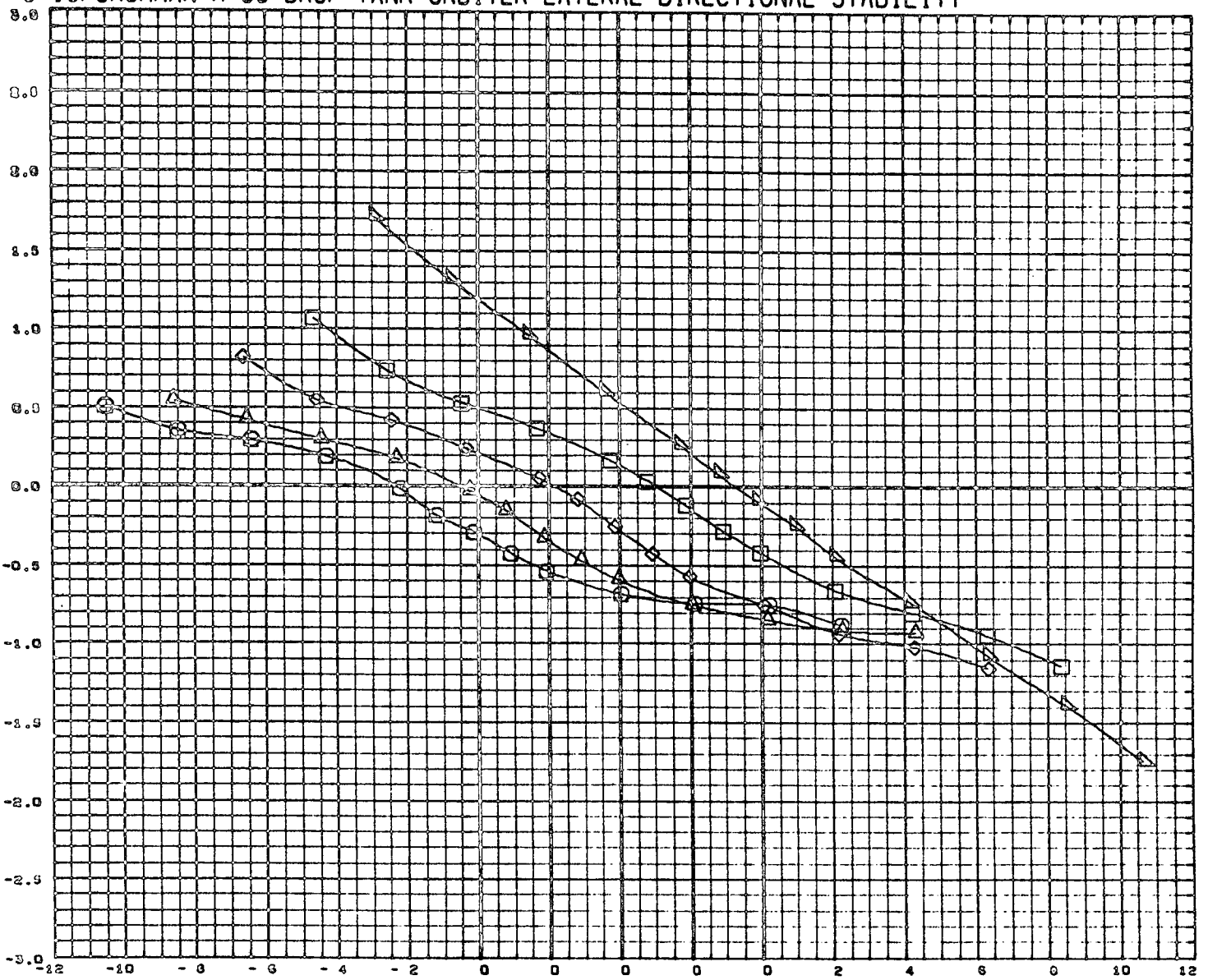
SYMBOL	MACH		PARAMETRIC VALUES		
○	3.480	ALPHA	0.000	PHI	90.000
△	4.959	WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	0.905
▷	0.907
◇	1.102
□	1.203
▽	1.960

PARAMETRIC VALUES

ALPHA 0.000 PHI 90.000

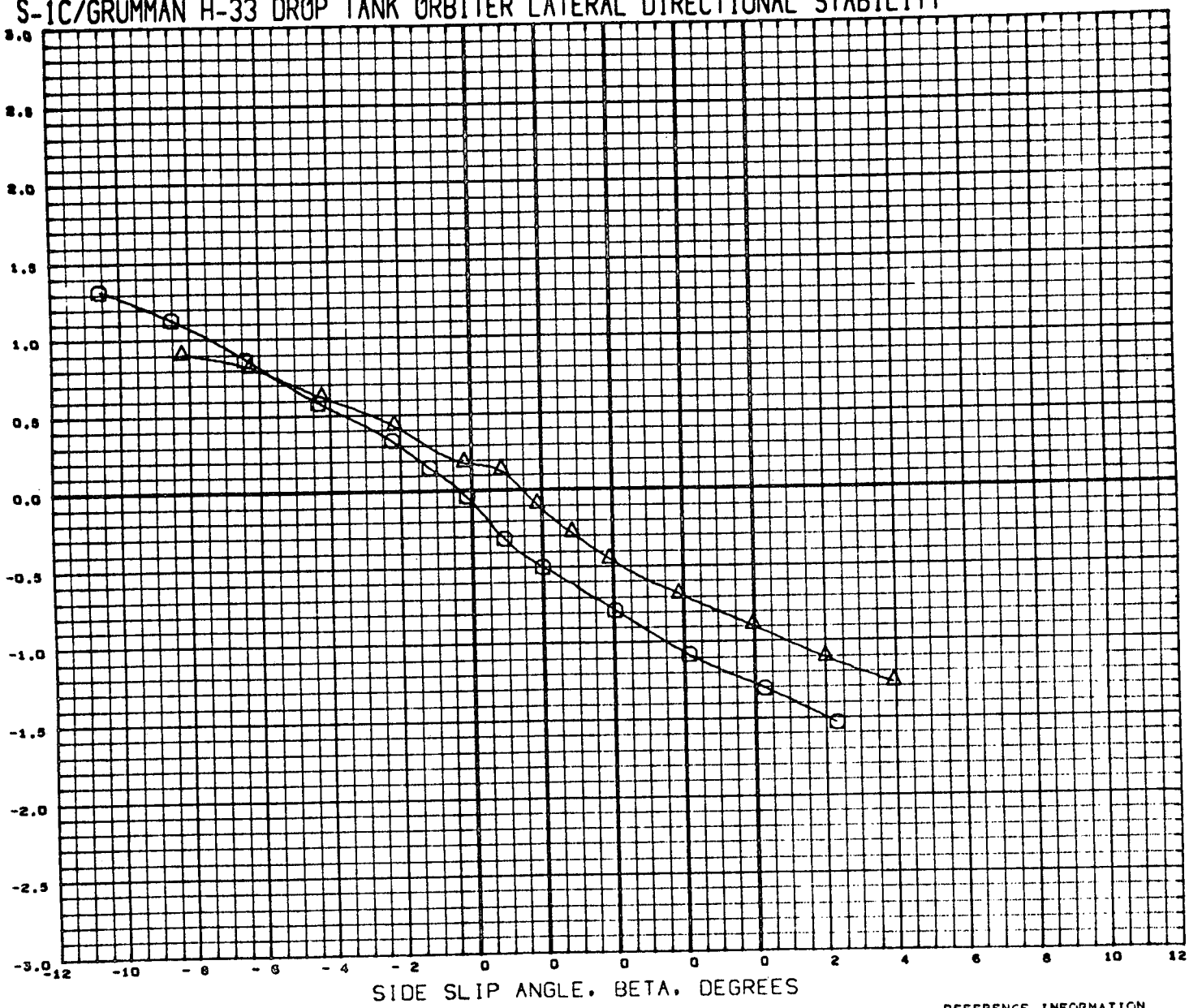
WNGIN 0.000

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



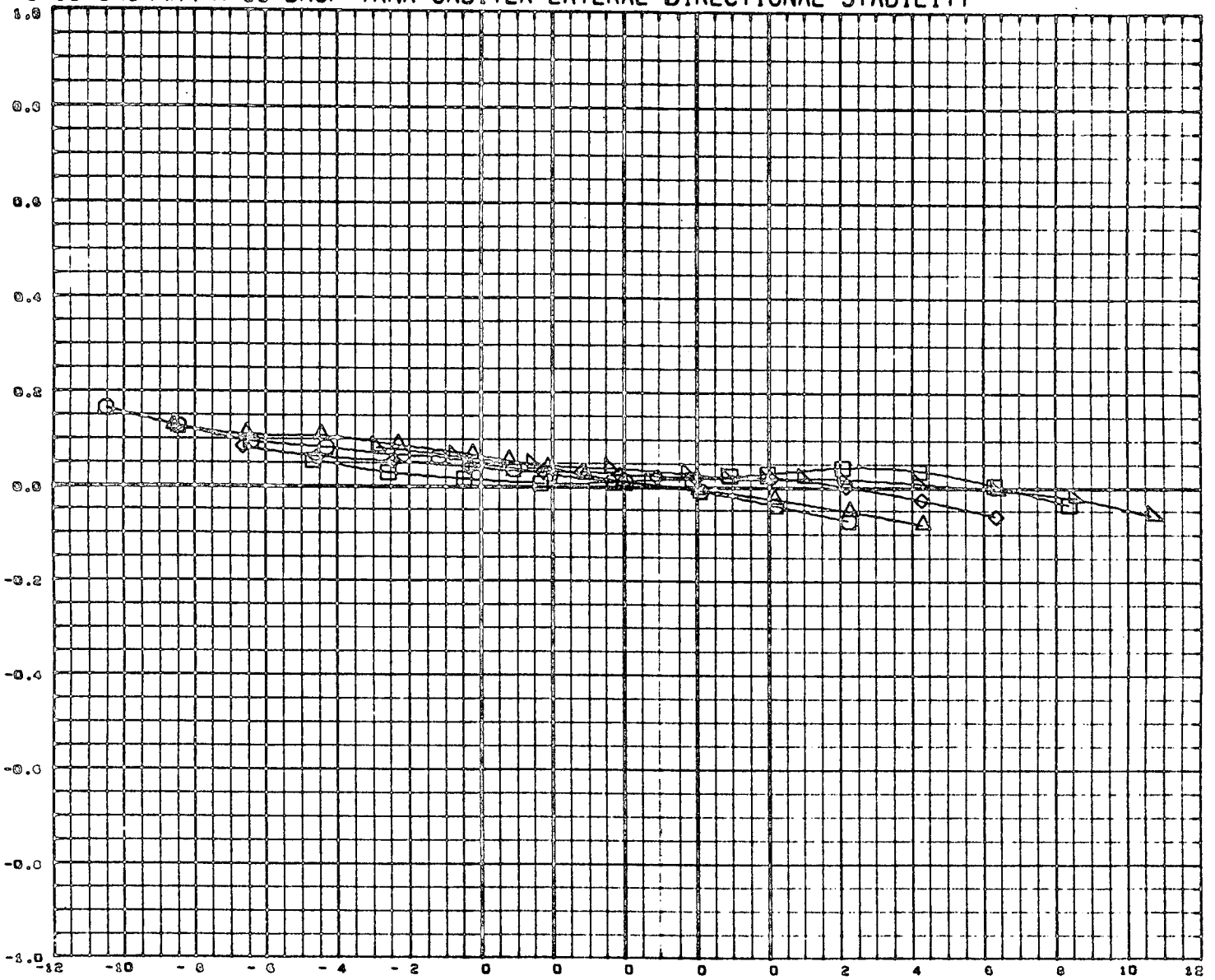
SYMBOL	MACH		PARAMETRIC VALUES		
○	3.480	ALPHA	0.000	PHI	90.000
△	4.959	WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	0.905
△	0.997
□	1.102
◇	1.203
▽	1.960

PARAMETRIC VALUES

ALPHA 0.000 PHI 90.000

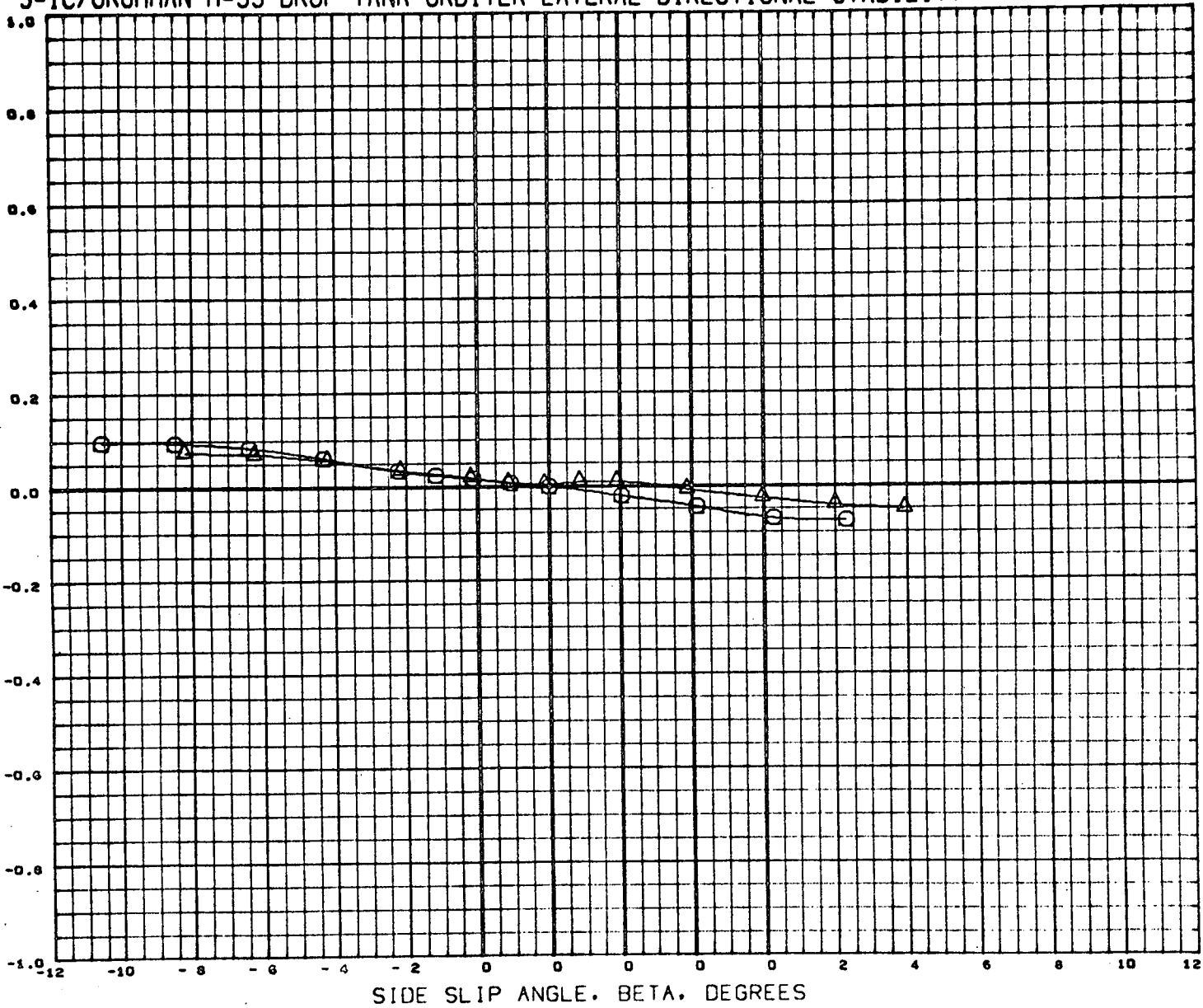
WNGIN 0.000

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



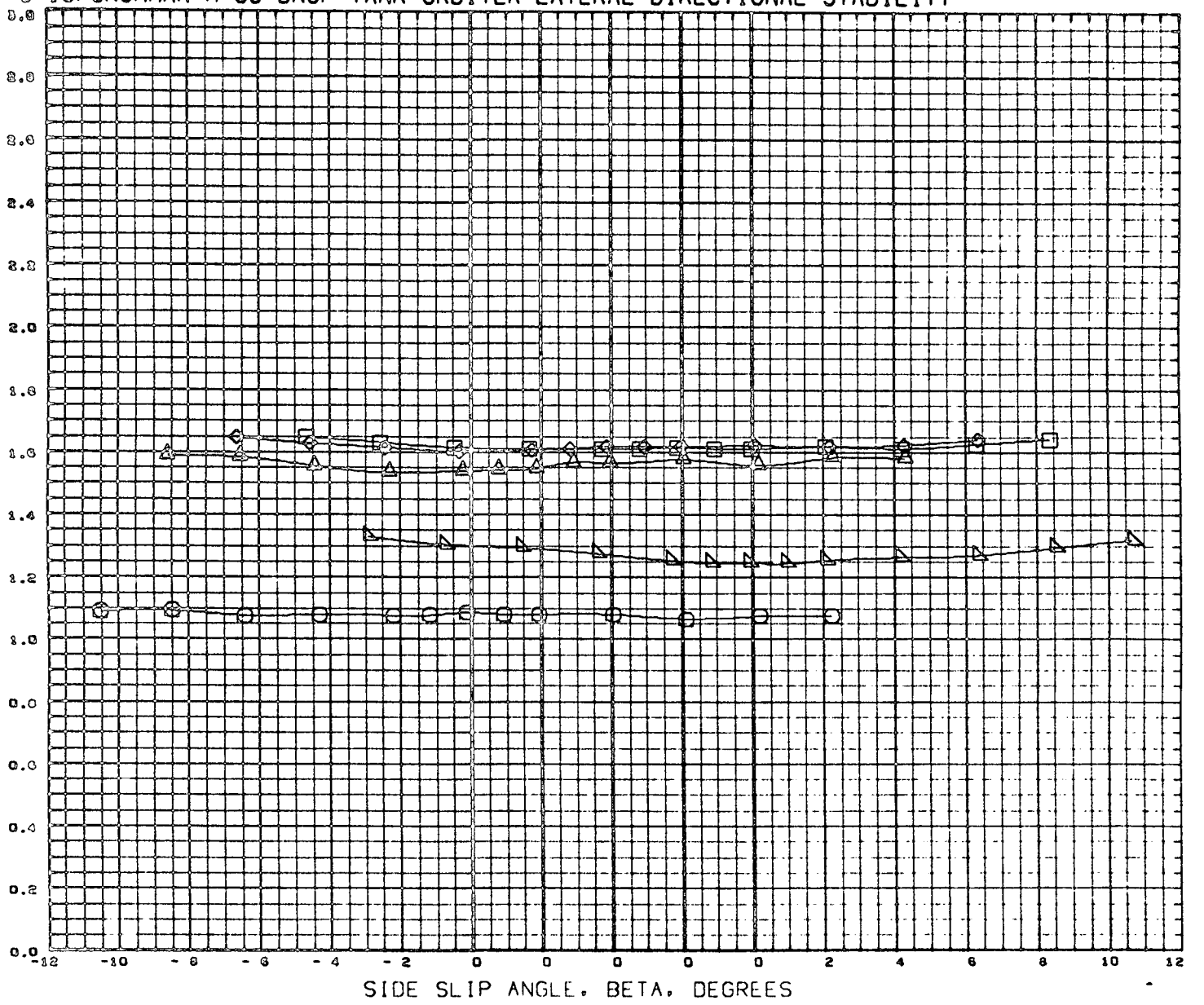
SYMBOL	MACH		PARAMETRIC VALUES		
○	3.480	ALPHA	0.000	PHI	90.000
△	4.959	WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



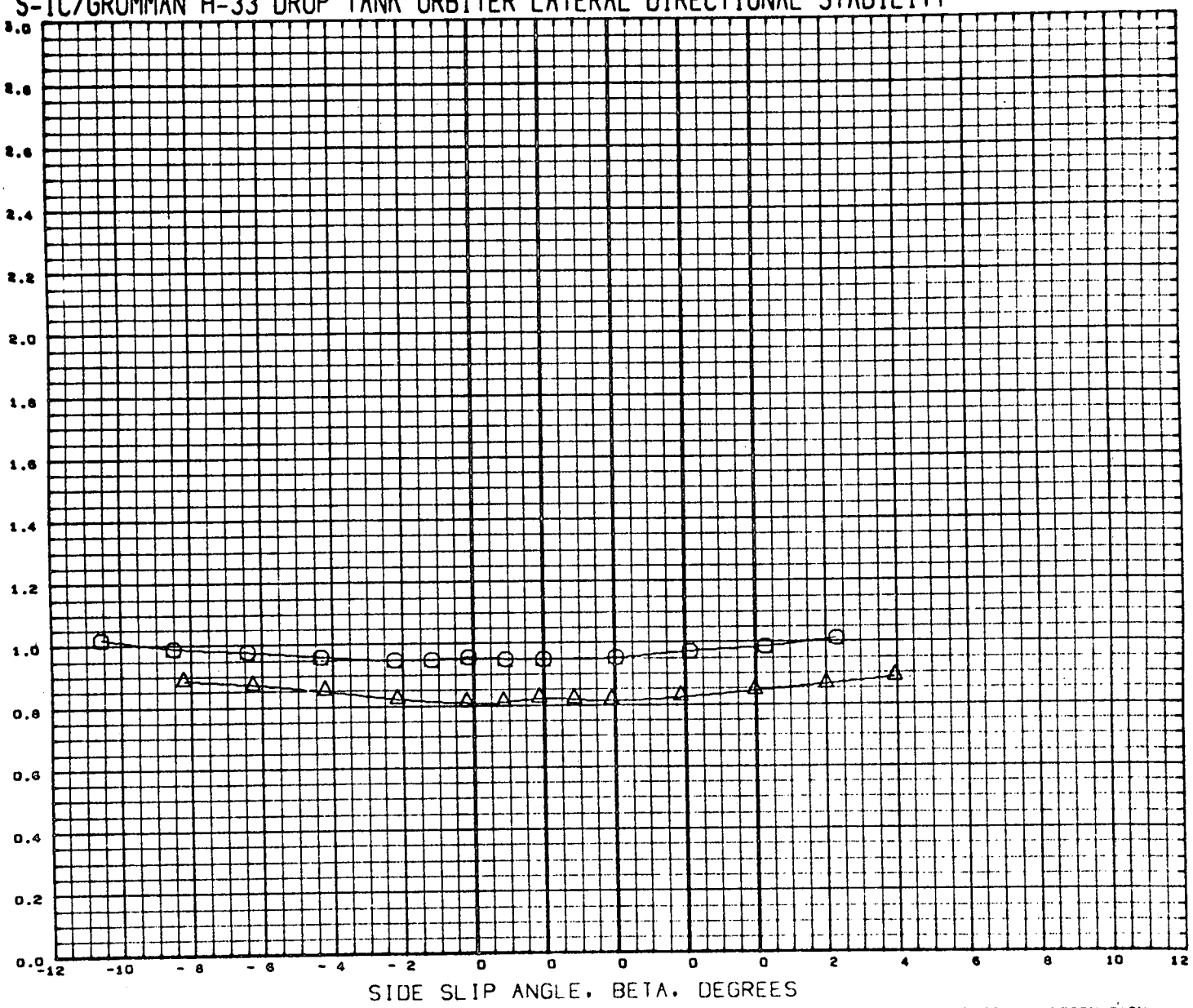
SYMBOL	MACH	PARAMETRIC VALUES			
	0.905	ALPHA	0.000	PHI	90.000
	0.997	WNGIN	0.000		
	1.102				
	1.203				
	1.060				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



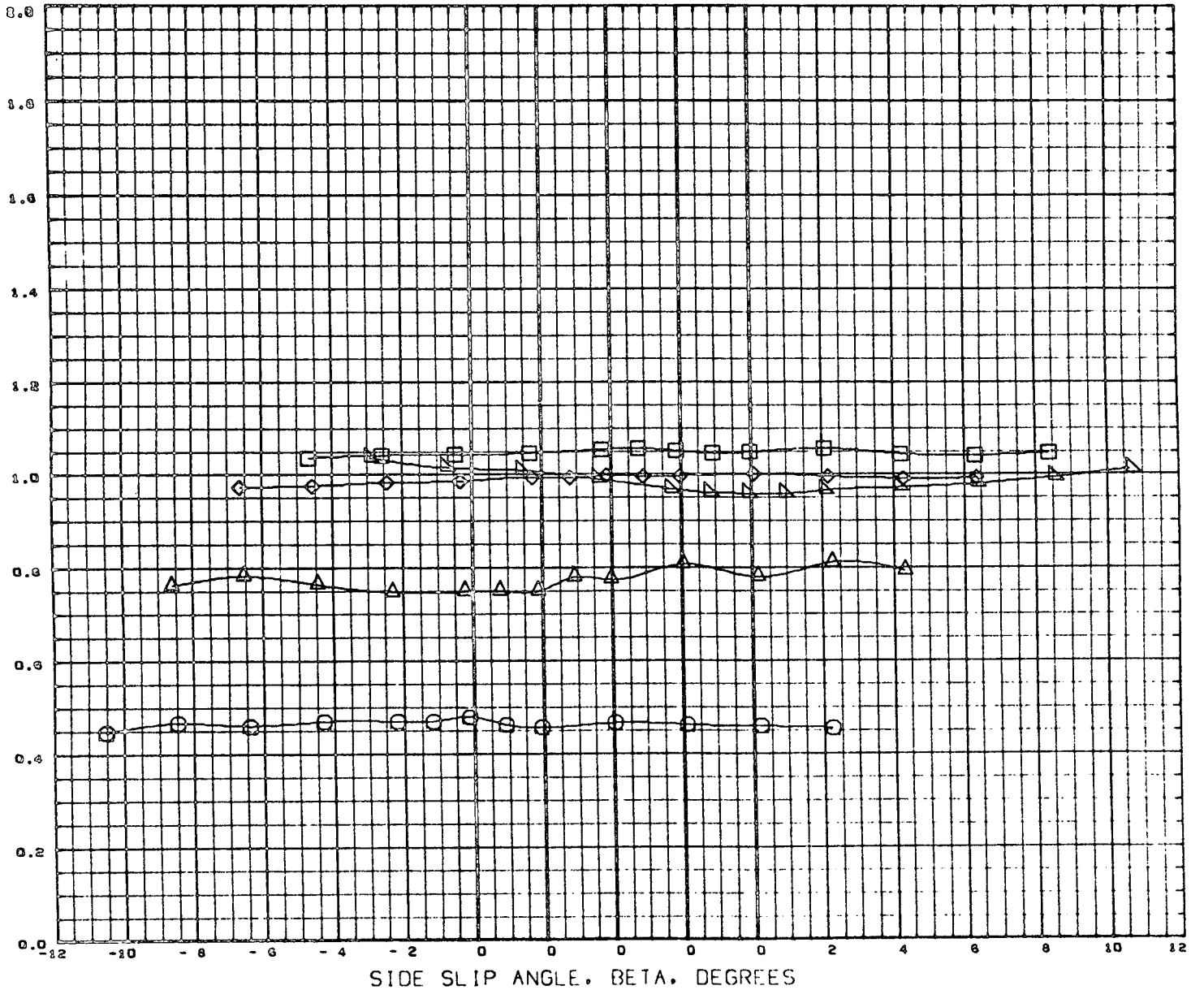
SYMBOL	MACH		PARAMETRIC VALUES		
○	3.480	ALPHA	0.000	PHI	90.000
△	4.959	WBGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
☒	0.905
⊗	0.997
◇	1.102
△	1.203
▽	1.960

PARAMETRIC VALUES

ALPHA 0.000 PHI 90.000

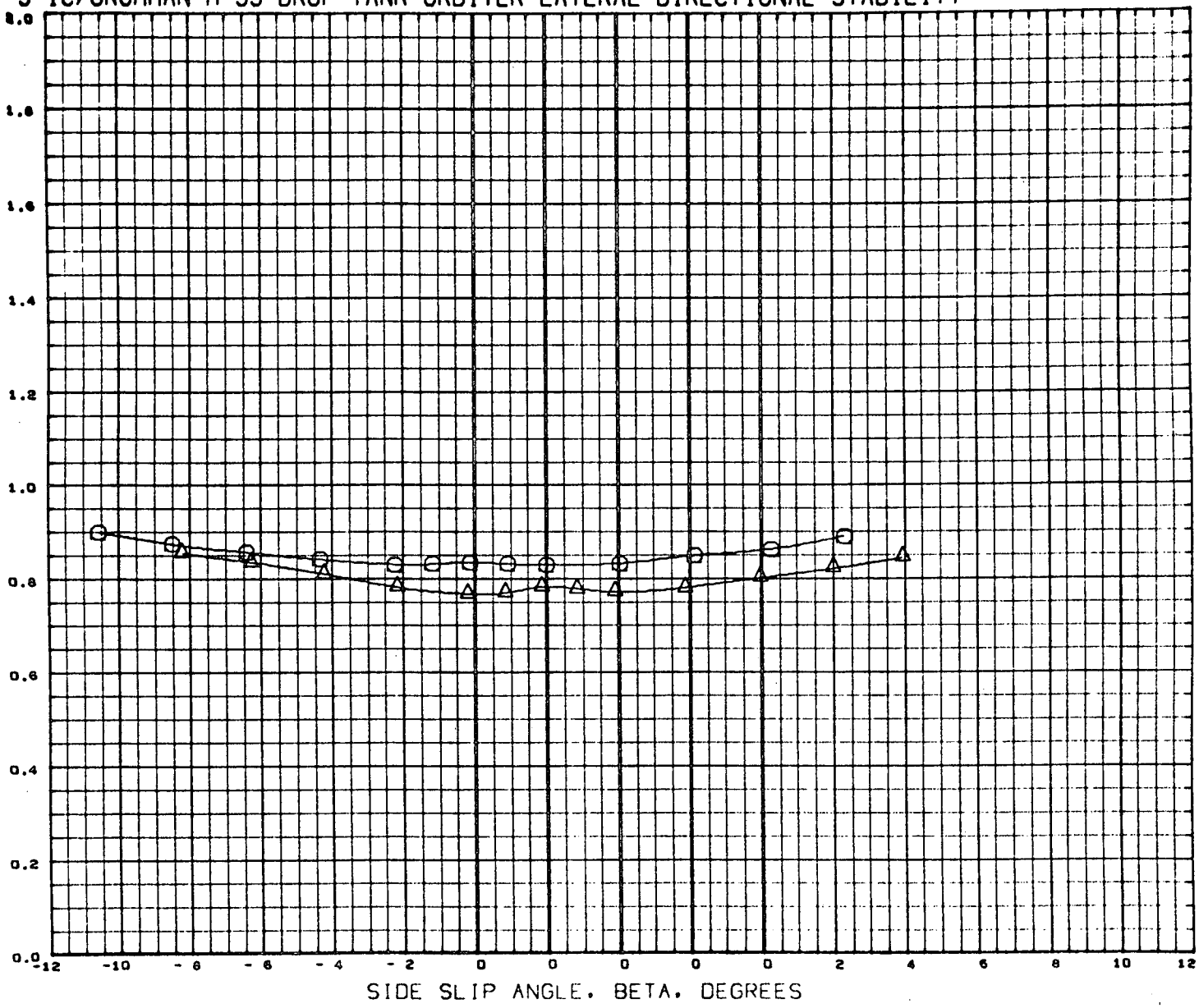
MACH 0.000

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



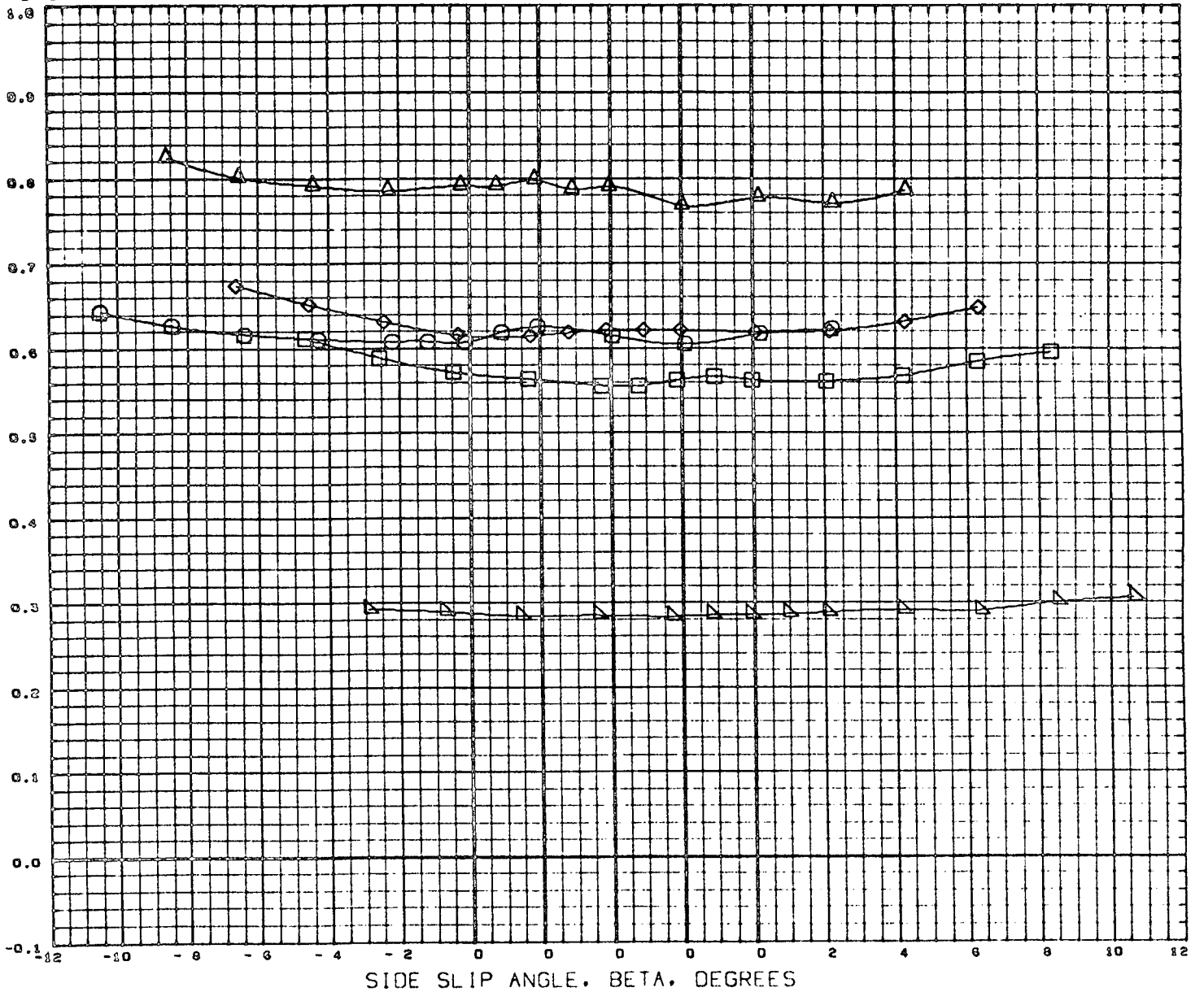
SYMBOL	MACH		PARAMETRIC VALUES		
○	3.480	ALPHA	0.000	PHI	90.000
△	4.959	WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	0.909
△	0.997
◇	1.102
□	1.203
▽	1.960

PARAMETRIC VALUES

ALPHA 0.000 PHI 90.000

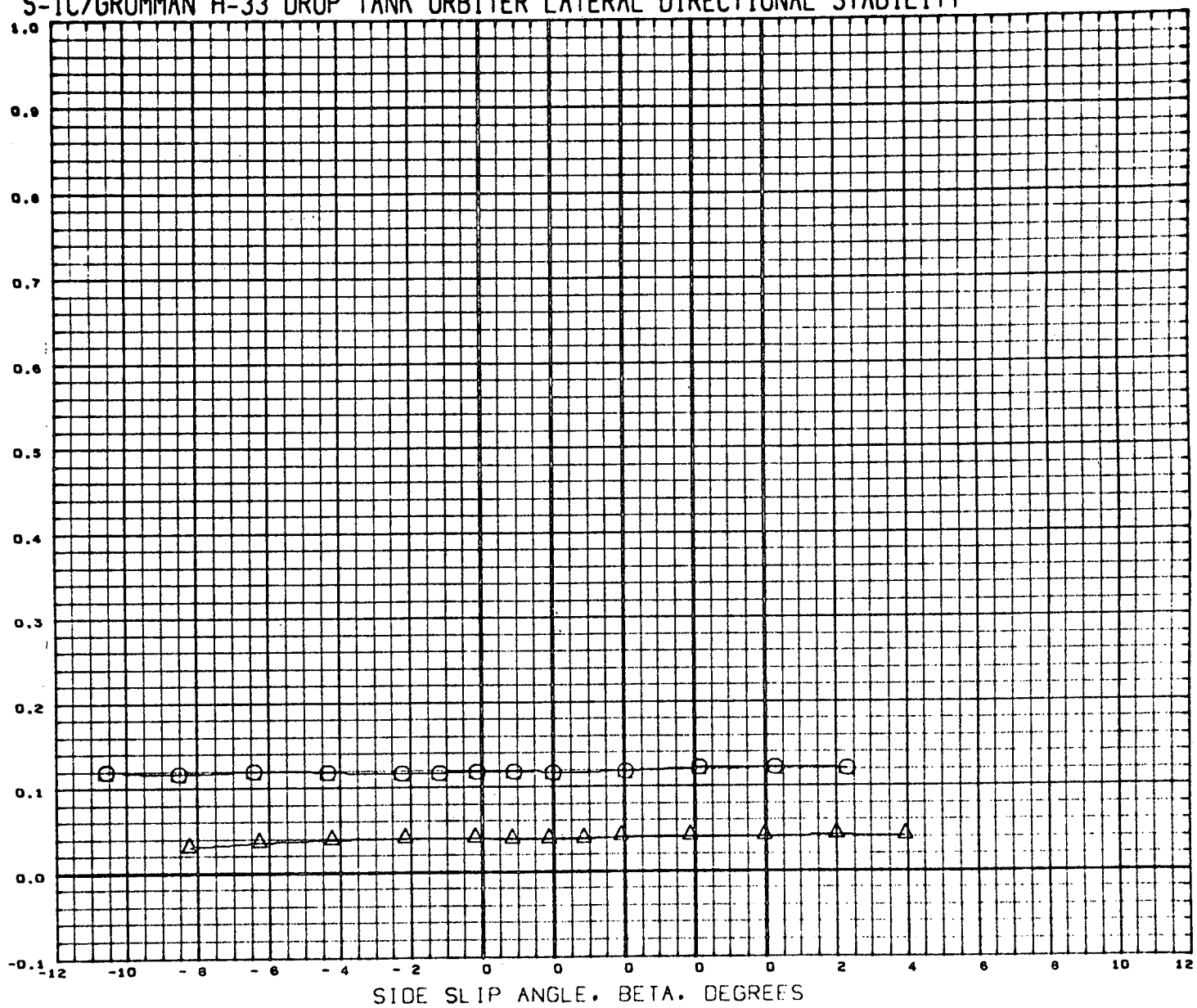
WNGIN 0.000

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



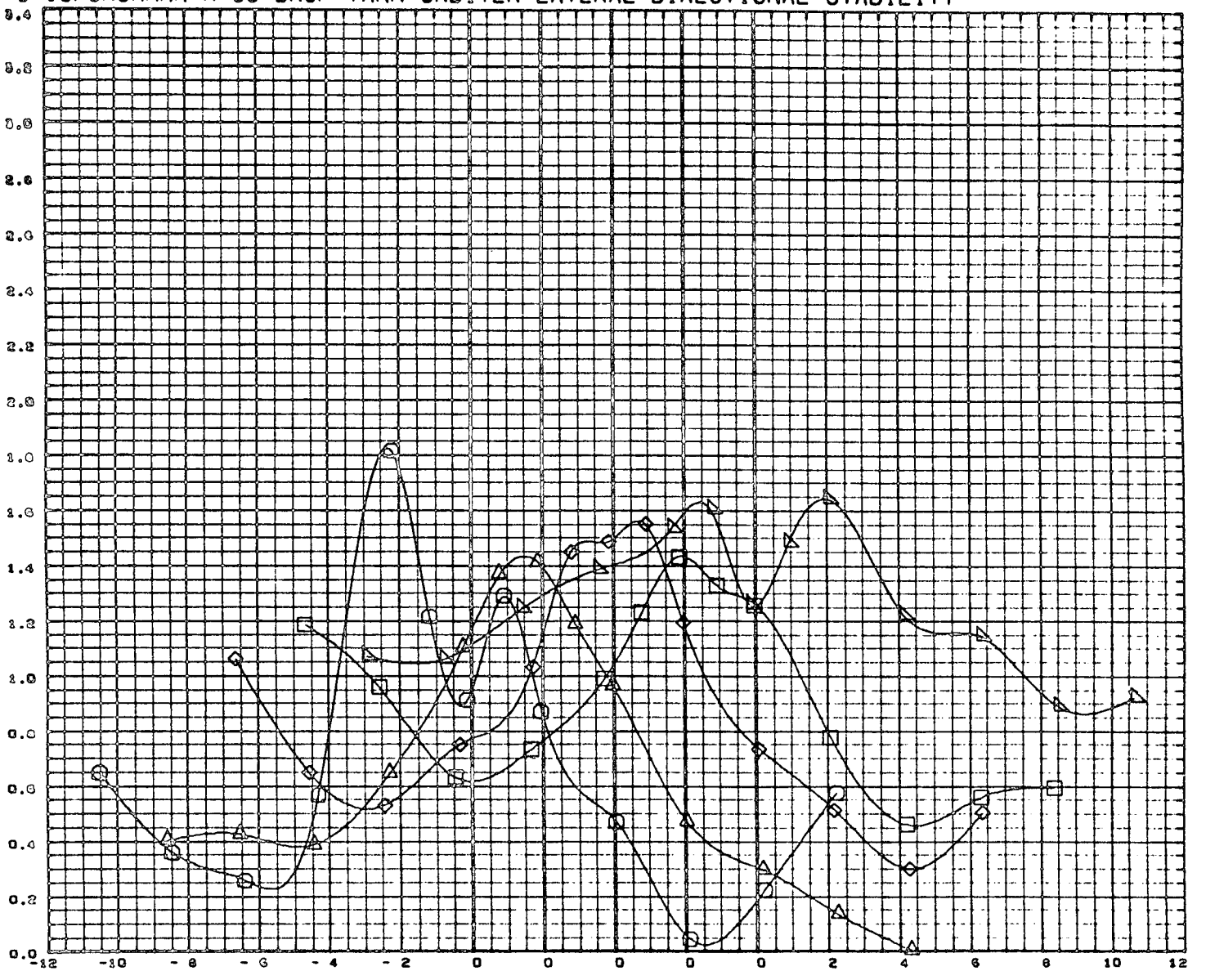
SYMBOL	MACH		PARAMETRIC VALUES		
○	3.480	ALPHA	0.000	PHI	90.000
△	4.959	WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
	0.905
	0.997
	1.102
	1.203
	1.900

PARAMETRIC VALUES

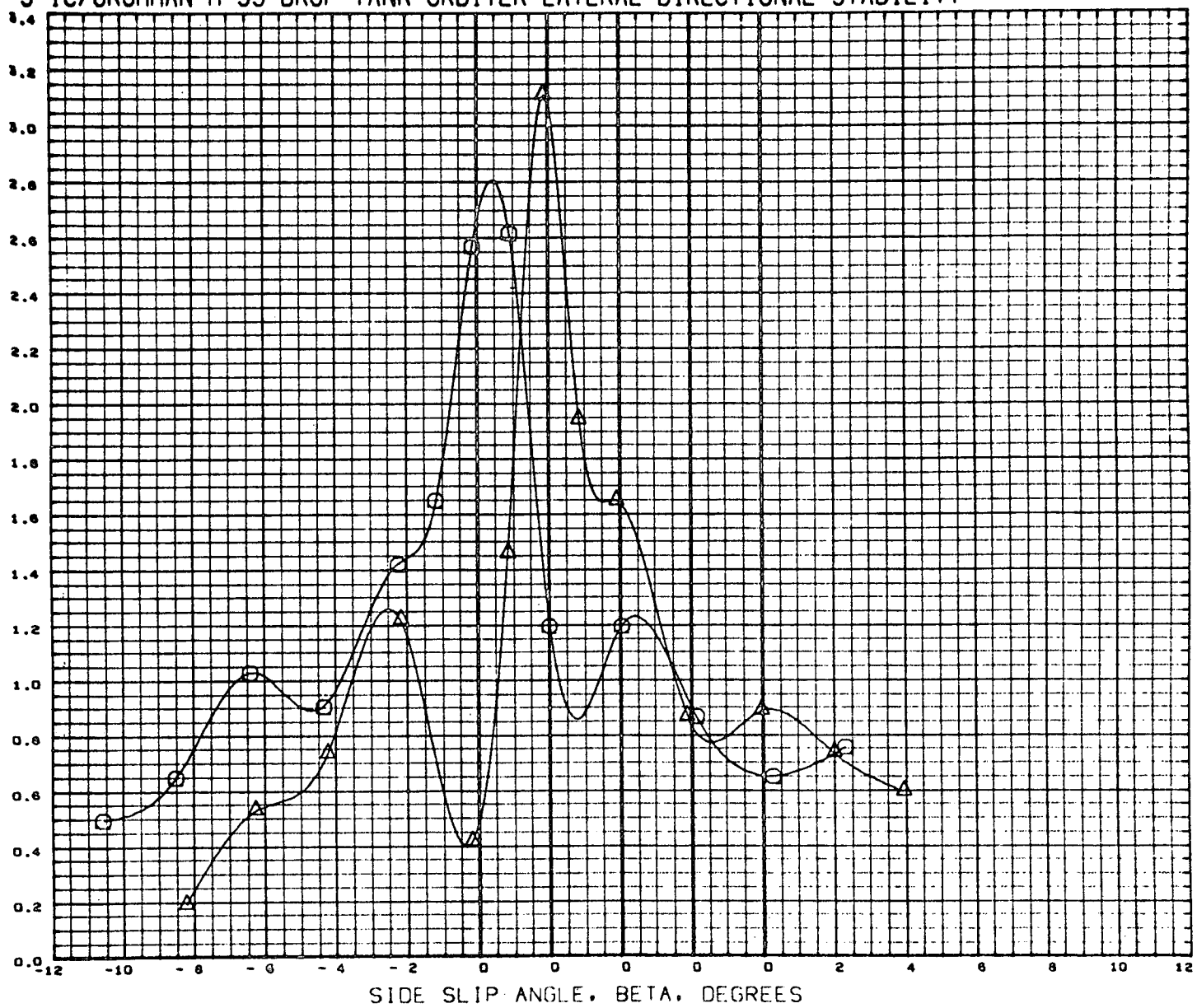
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



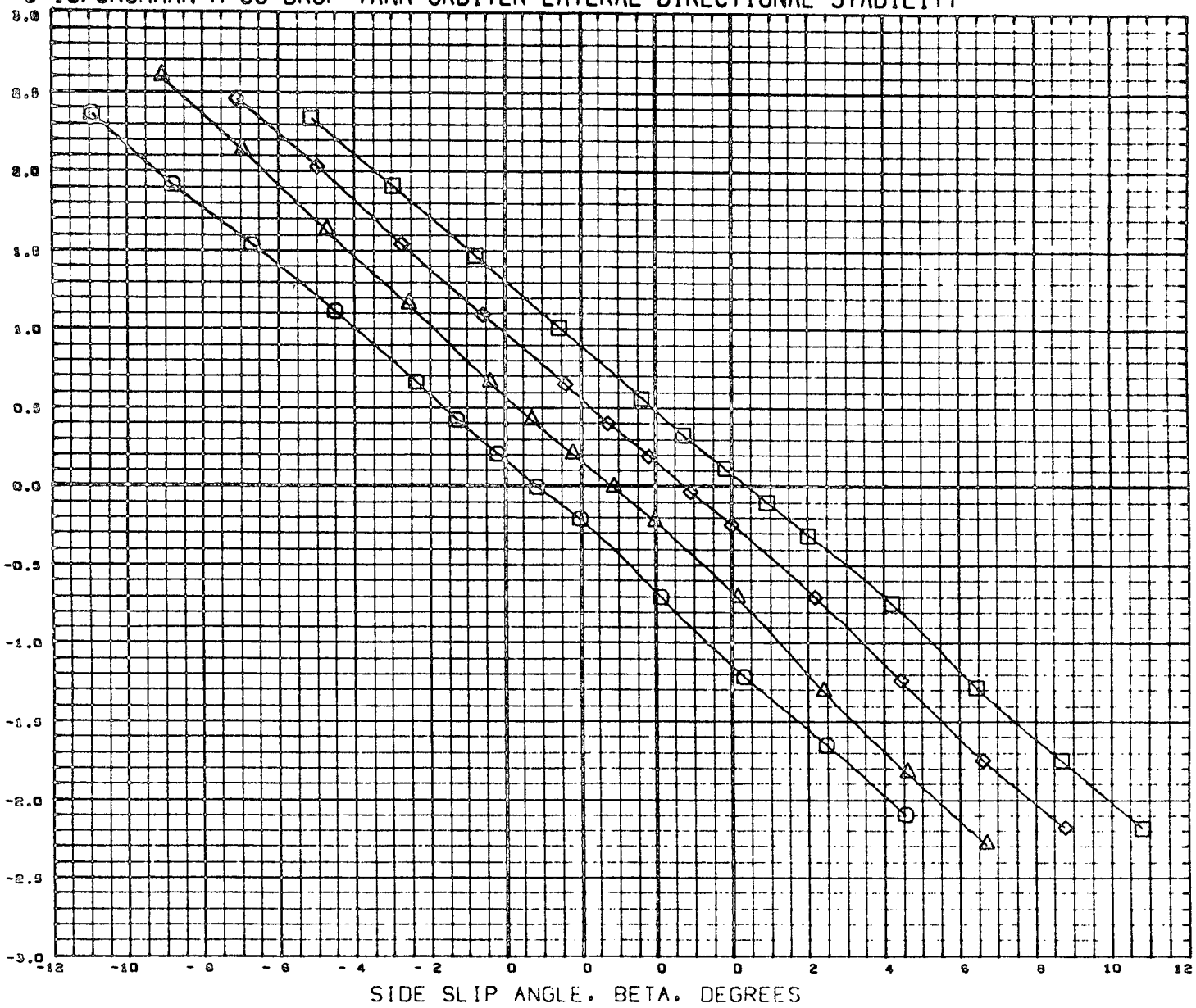
SYMBOL	MACH		PARAMETRIC VALUES		
○	3.480	ALPHA	0.000	PHI	90.000
△	4.959	WRGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



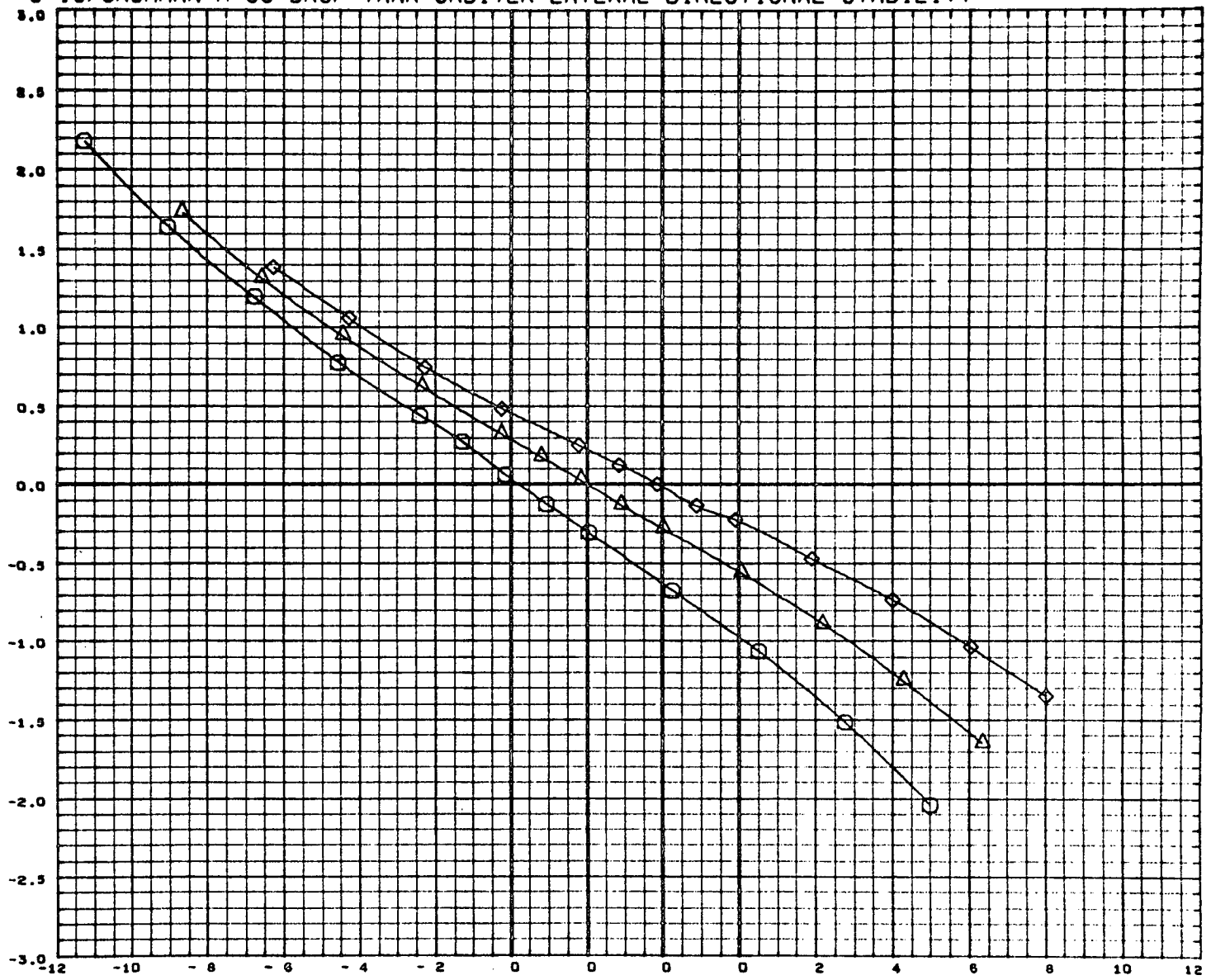
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.900	ALPHA	0.000	PHI	90.000
△	0.999	WBGIN	0.000		
◇	1.101				
□	1.200				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



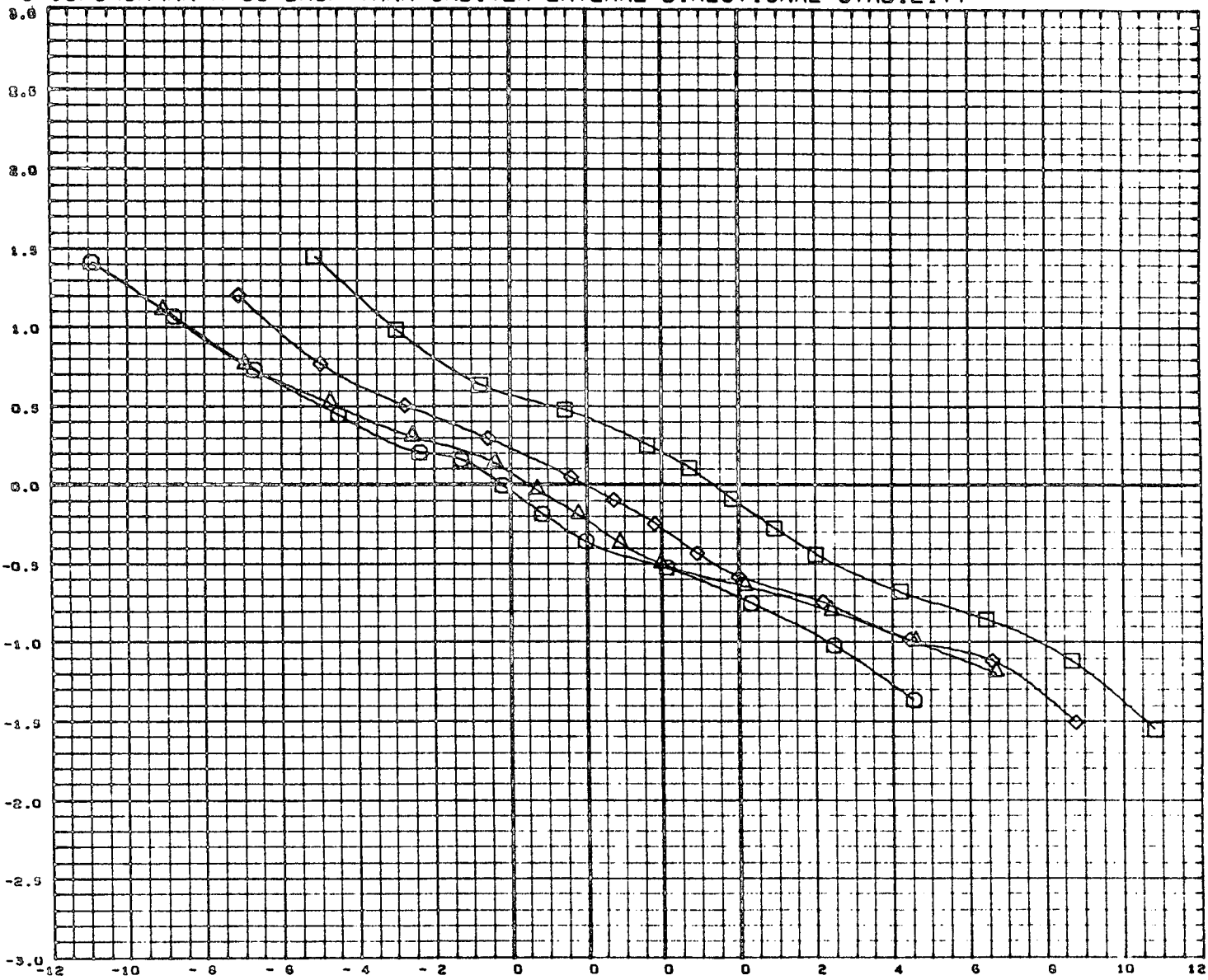
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.960	ALPHA	0.000	PHI	90.000
△	3.480	WNGIN	0.000		
◇	4.950				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

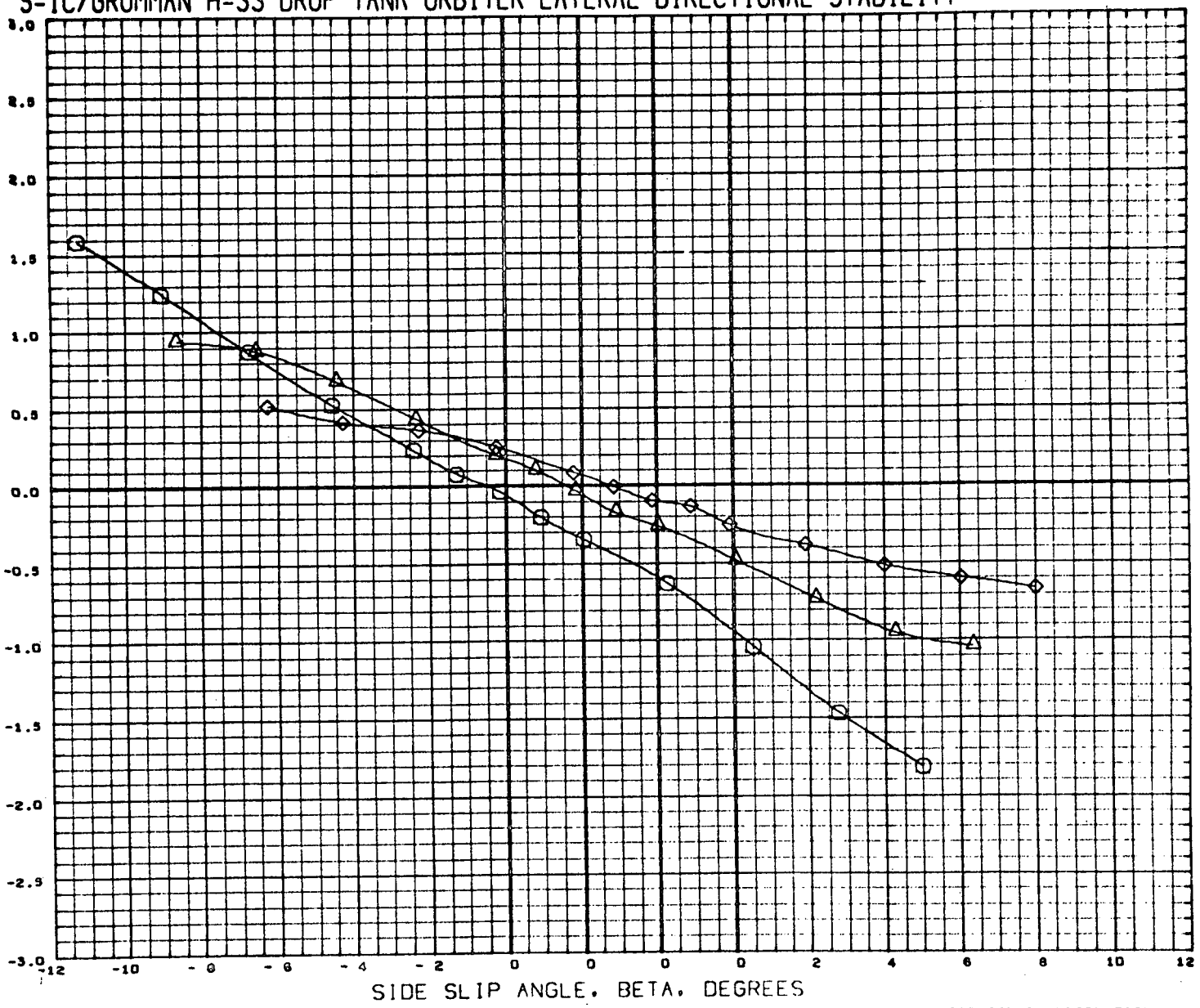


SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	ALPHA	0.000	PHI	90.000
△	0.990	WNGIN	0.000		
◇	1.101				
□	1.209				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



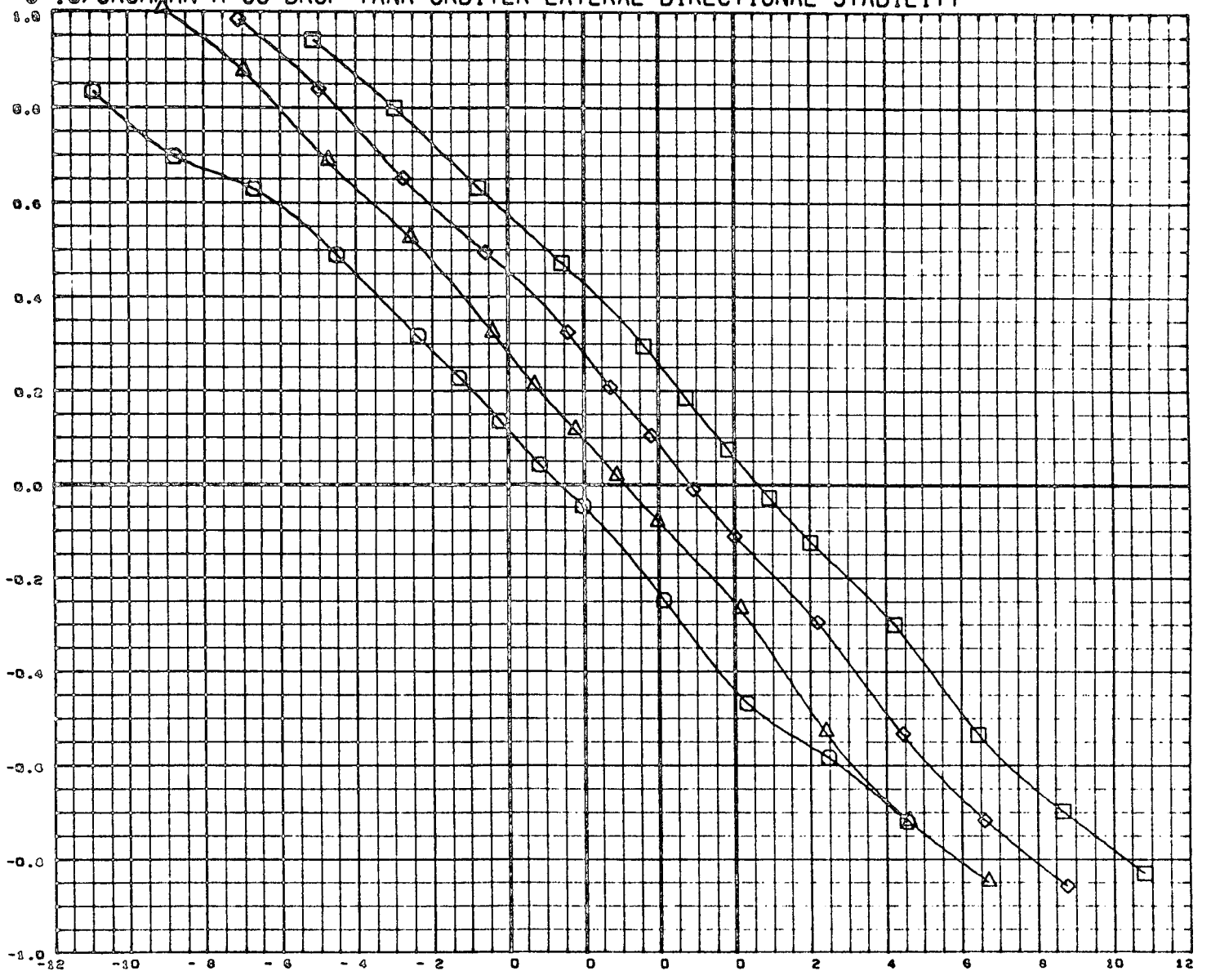
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.960	ALPHA	0.000	PHI	90.000
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

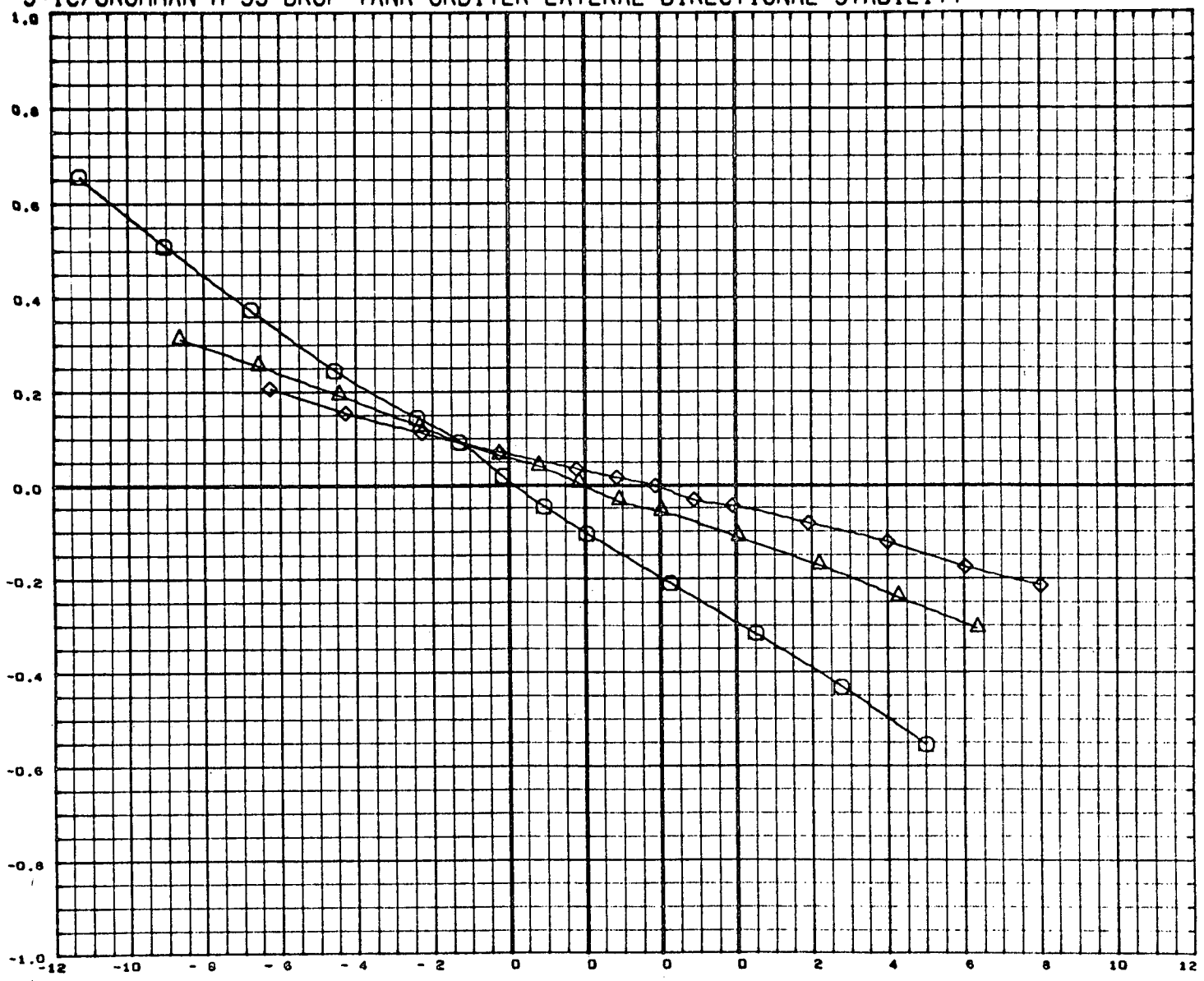


SYMBOL	MACH		PARAMETRIC VALUES		
○	0.900	ALPHA	0.000	PHI	90.000
△	0.990	WNGIN	0.000		
◇	1.101				
□	1.205				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-IC/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

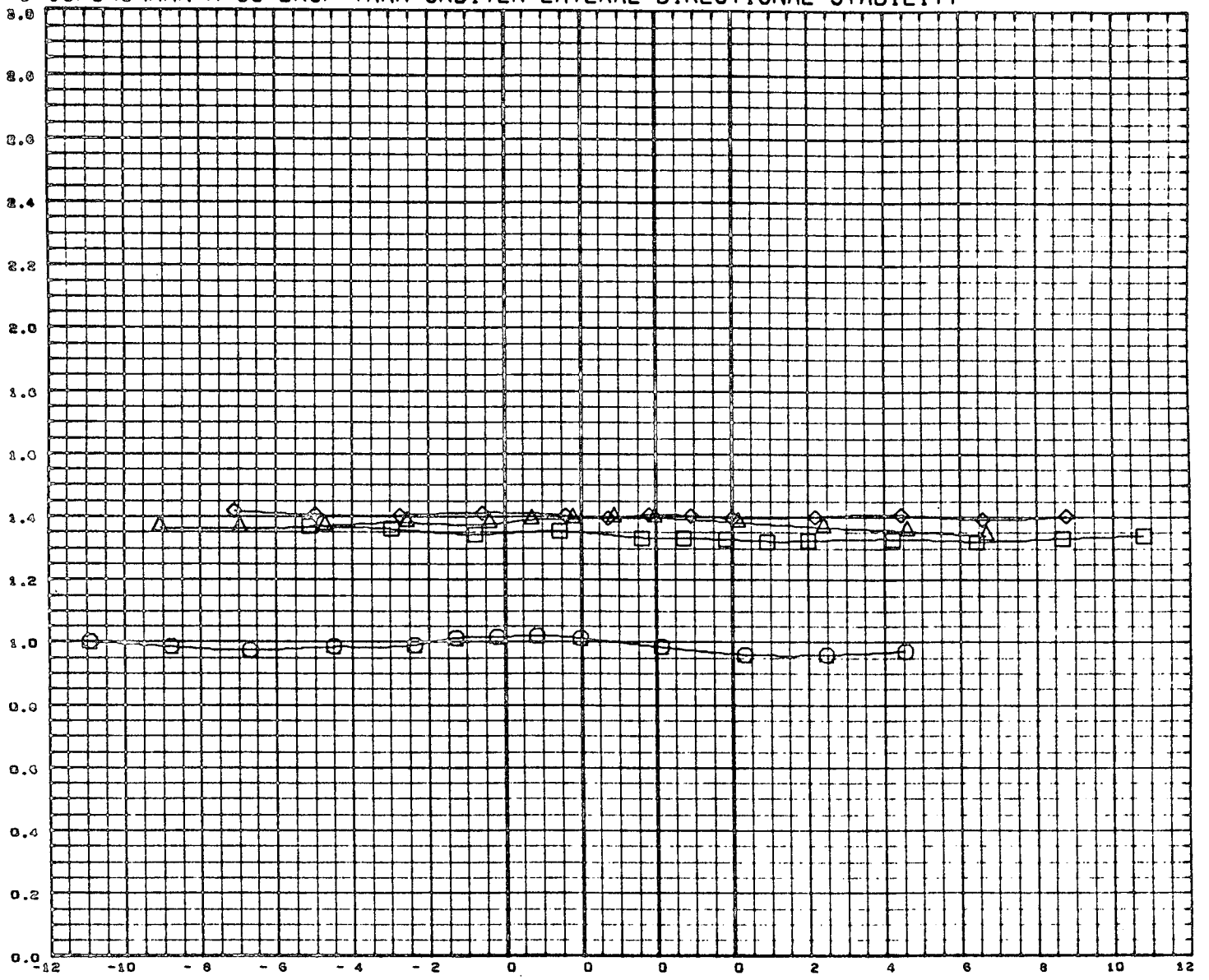


SYMBOL	MACH		PARAMETRIC VALUES		
○	1.960	ALPHA	0.000	PHI	90.000
△	3.460	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	0.900
△	0.990
◇	1.101
□	1.209

PARAMETRIC VALUES

ALPHA	0.000	PHI	90.000
WNGIN	0.000		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

SYMBOL	MACH
○	1.960
△	3.480
◇	4.959

PARAMETRIC VALUES

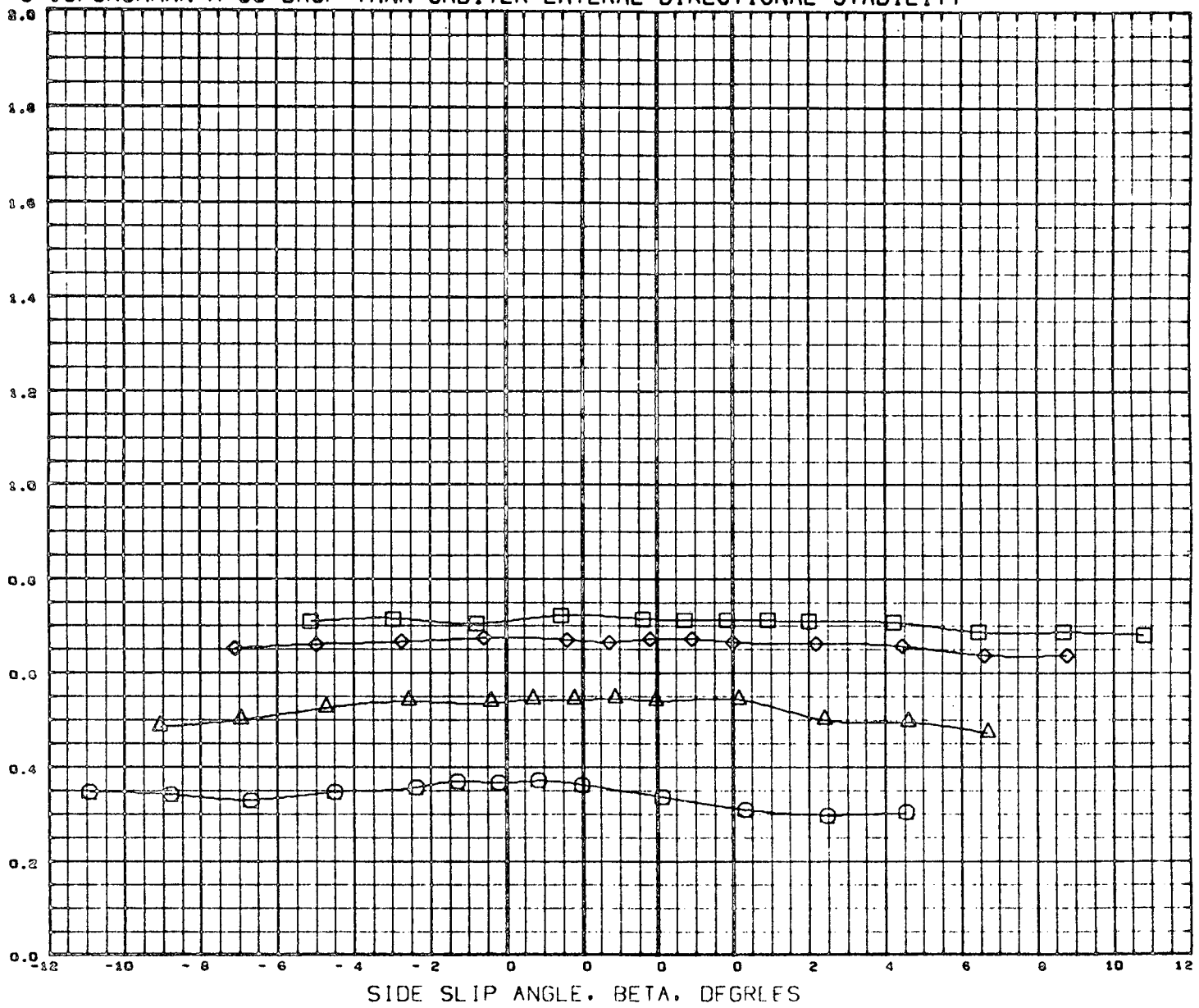
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

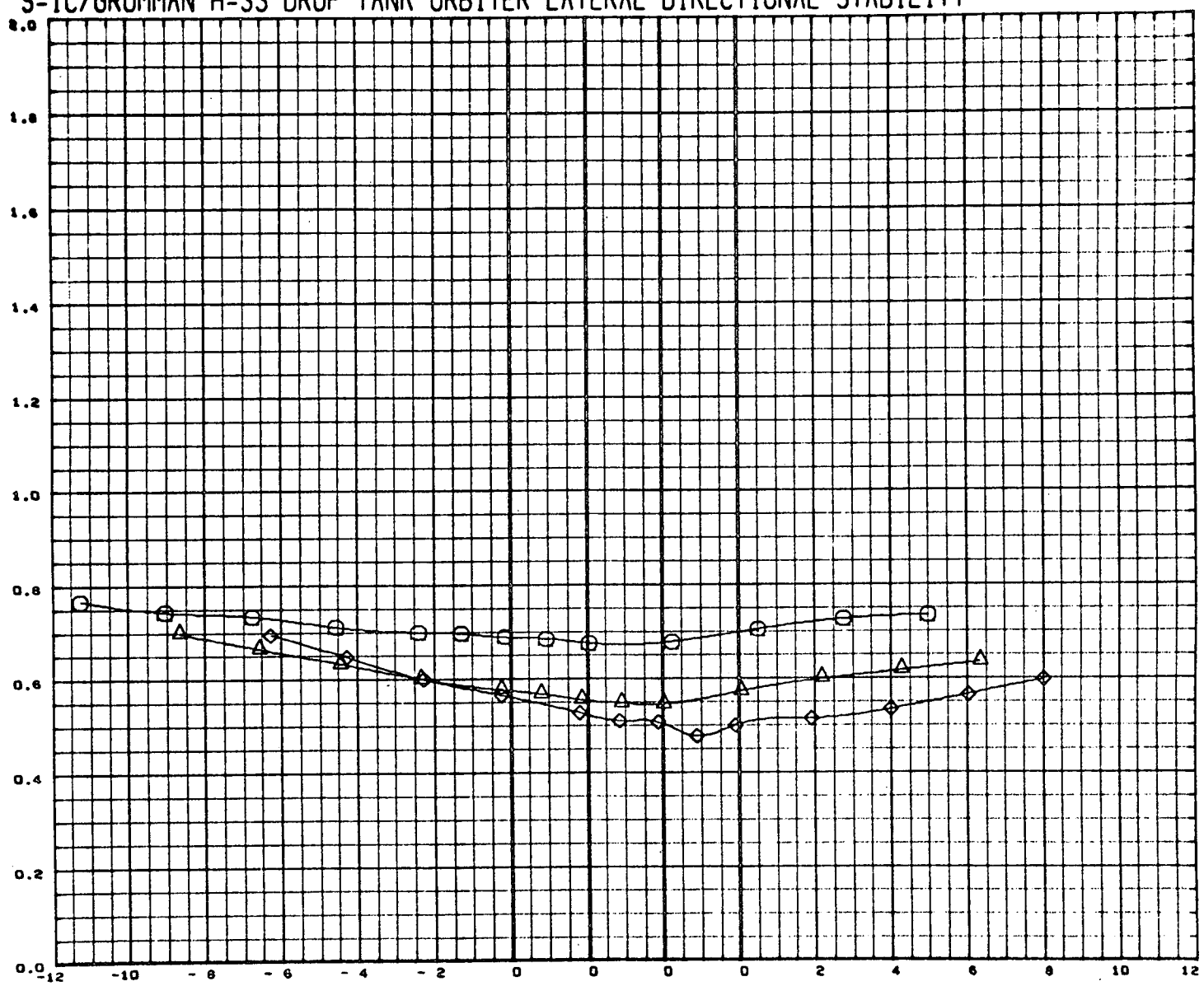


SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	ALPHA	0.000	PHI	90.000
△	0.998	WNGIN	0.000		
◇	1.101				
□	1.205				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES		
○	1.960	ALPHA	0.000	PHI	90.000
△	3.460	WNGIN	0.000		
◇	4.959				

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

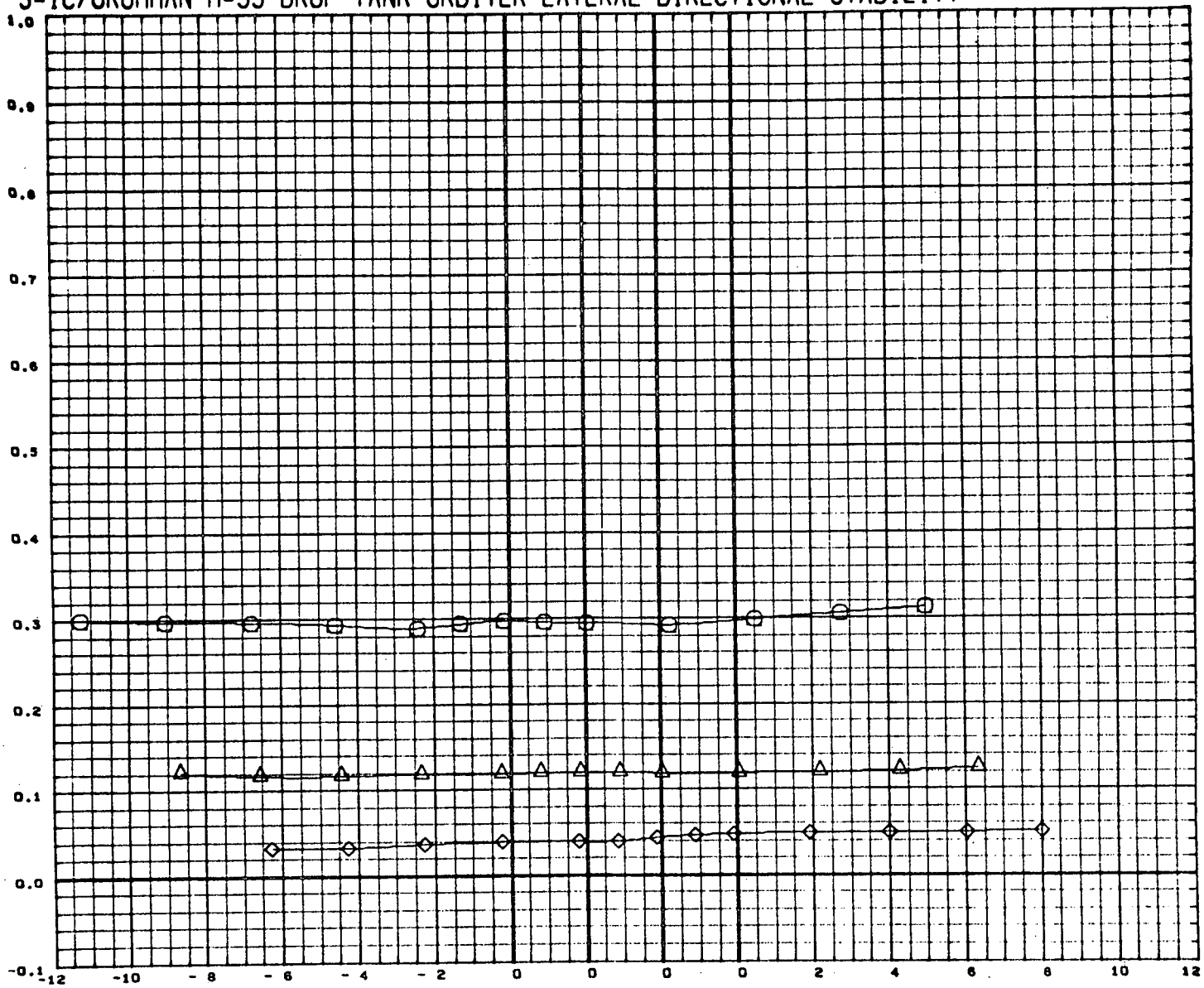
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

SYMBOL	MACH		PARAMETRIC VALUES		
○	0.900	ALPHA	0.000	PHI	90.000
△	0.990	WNGIN	0.000		
◇	1.101				
□	1.209				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



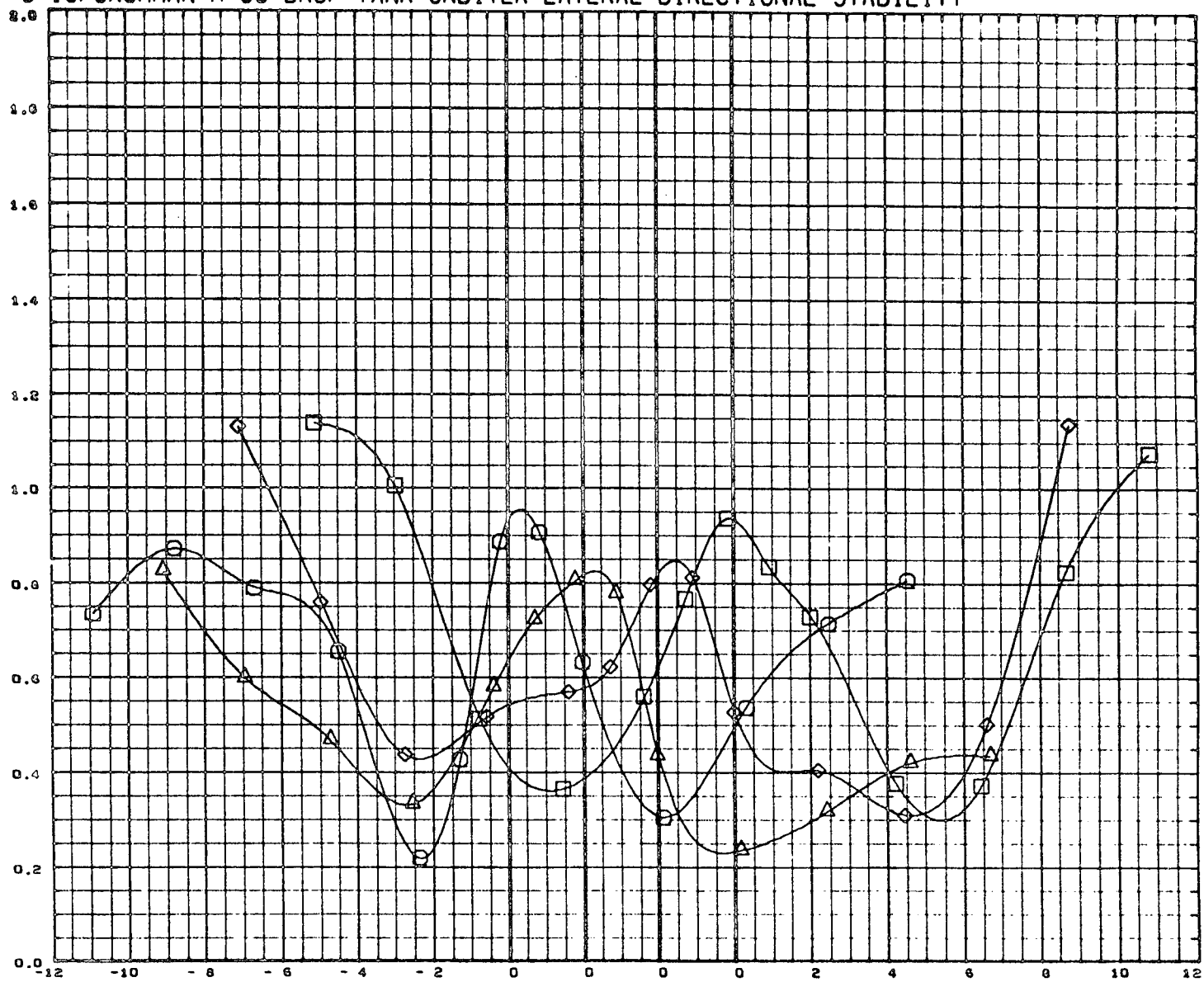
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.960	ALPHA	0.000	PHI	90.000
△	3.480	WNGIN	0.000		
◇	4.959				

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



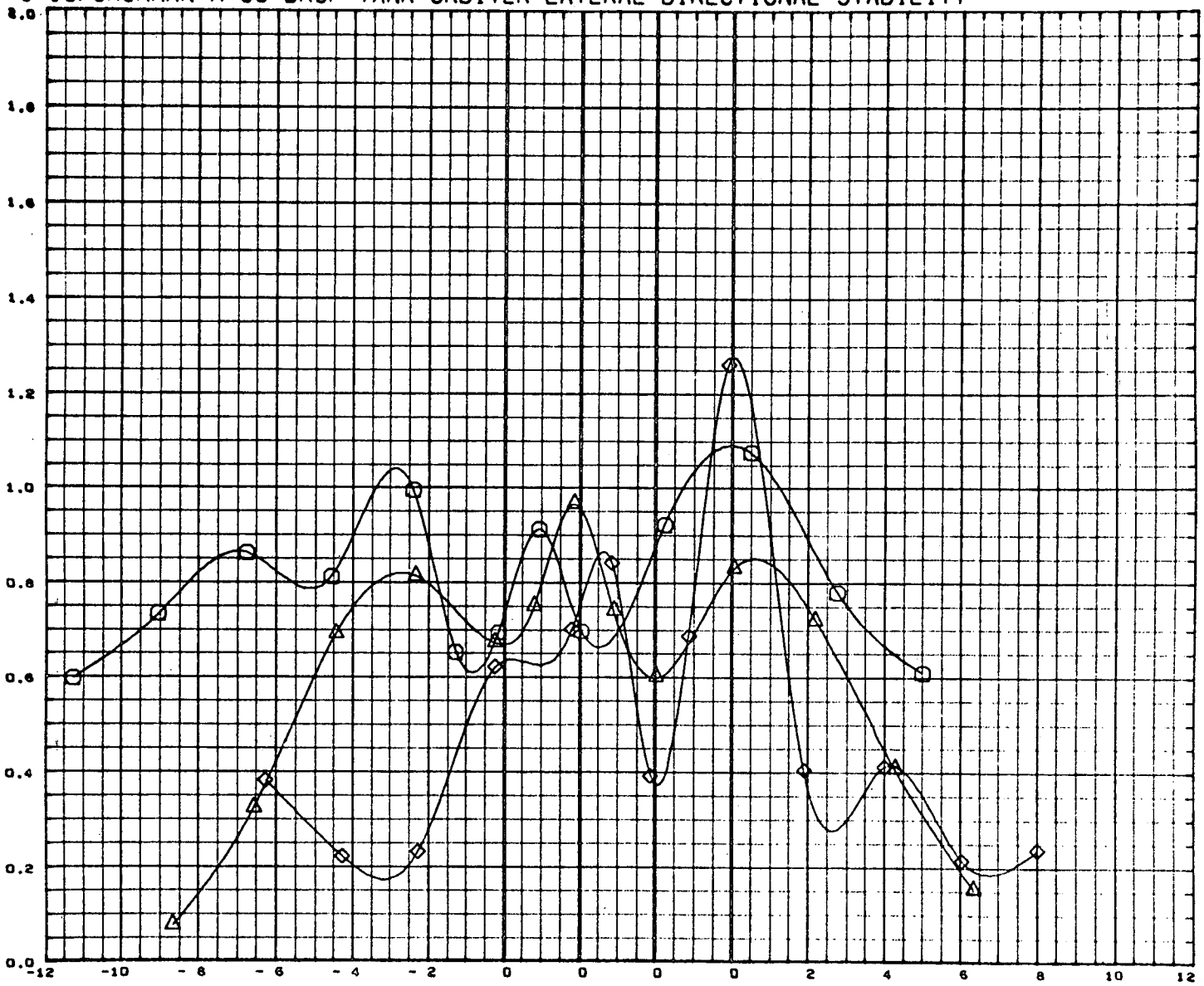
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.900	ALPHA	0.000	PHI	90.000
△	0.996	WNGIN	0.000		
◇	1.101				
□	1.203				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



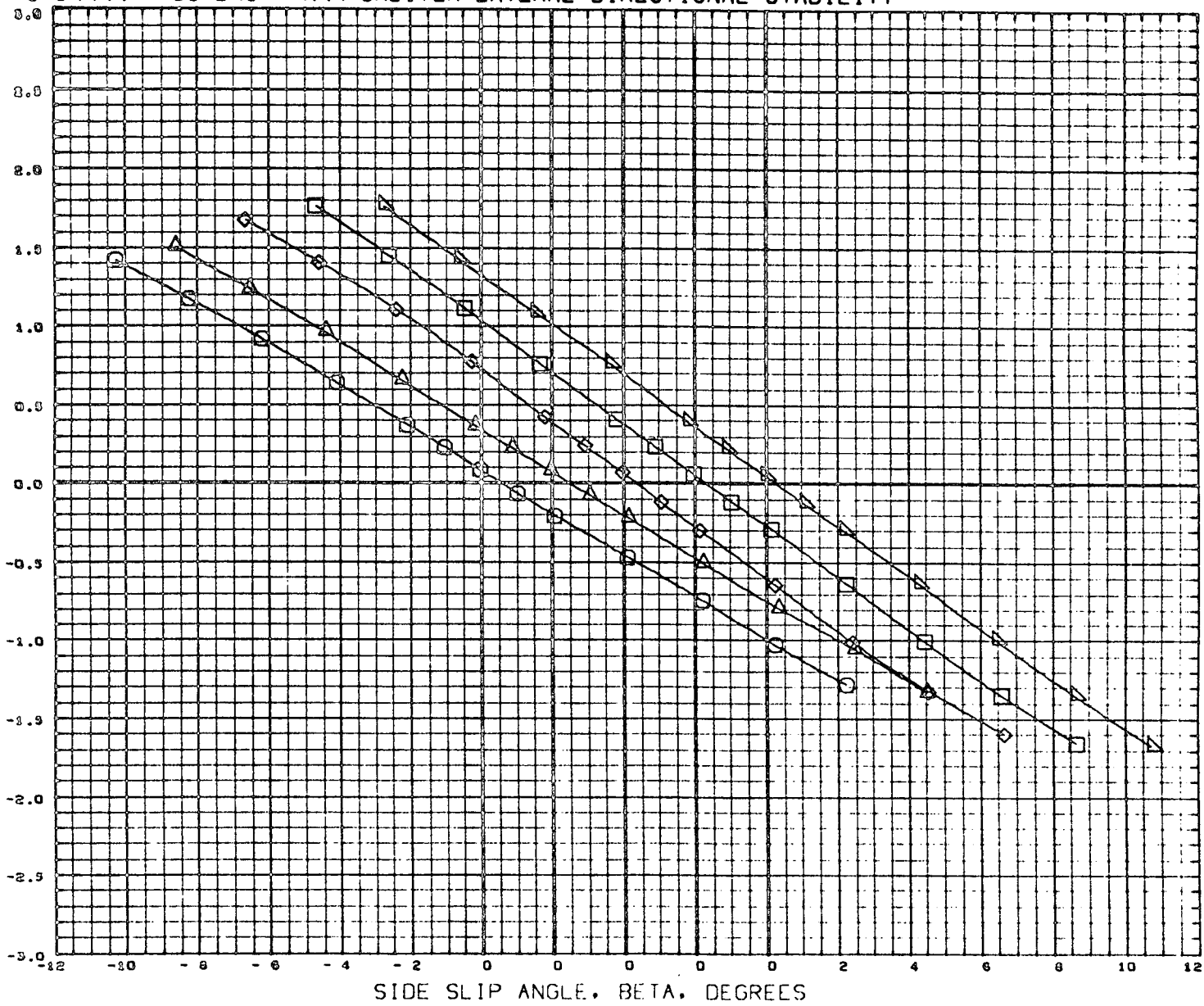
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.960	ALPHA	0.000	PHI	90.000
△	3.480	WNGIN	0.000		
◇	4.959				

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



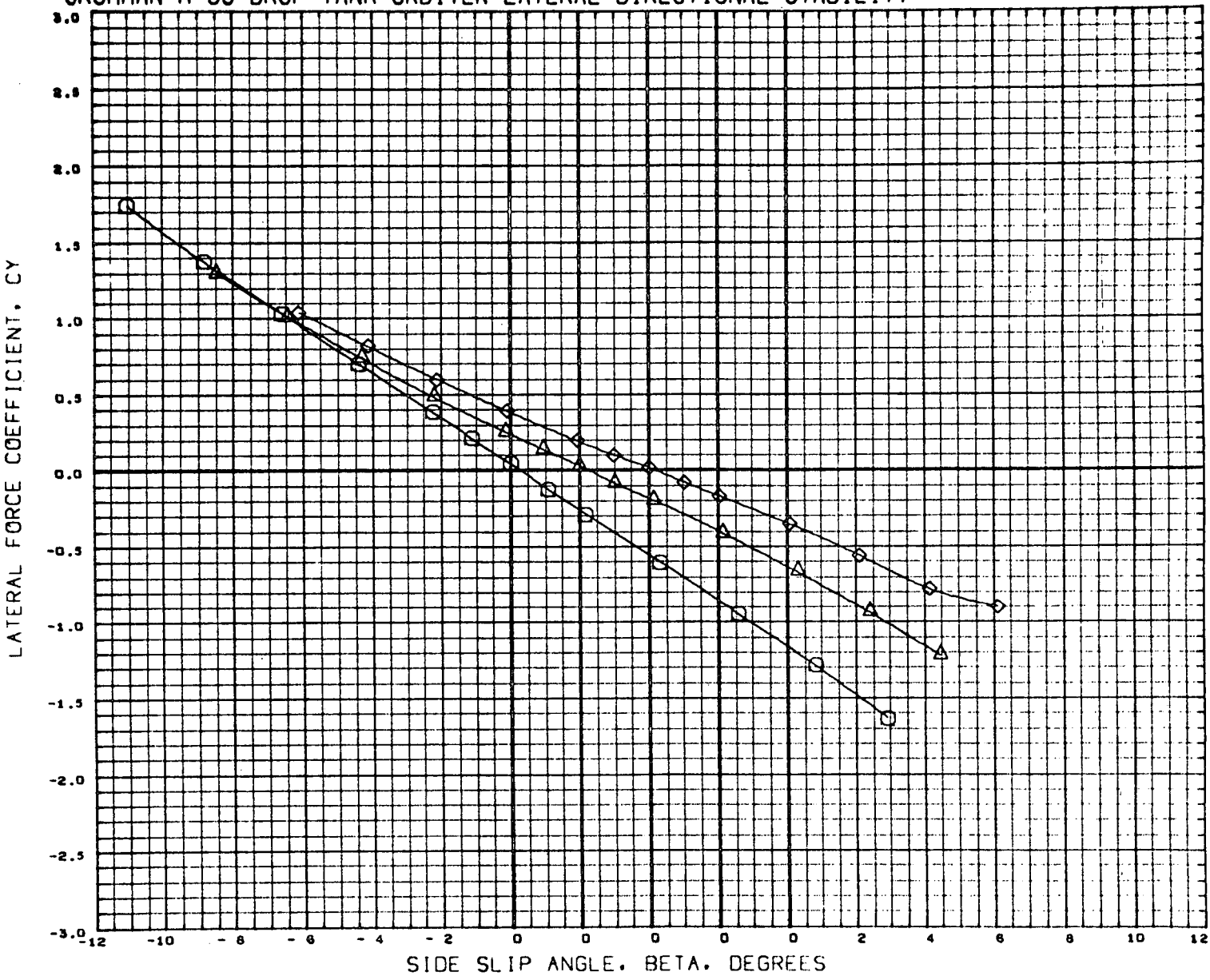
SYMBOL	MACH	PARAMETRIC VALUES	
○	0.596	ALPHA	0.000
△	0.895		
◇	0.994		
□	1.100		
▽	1.196		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



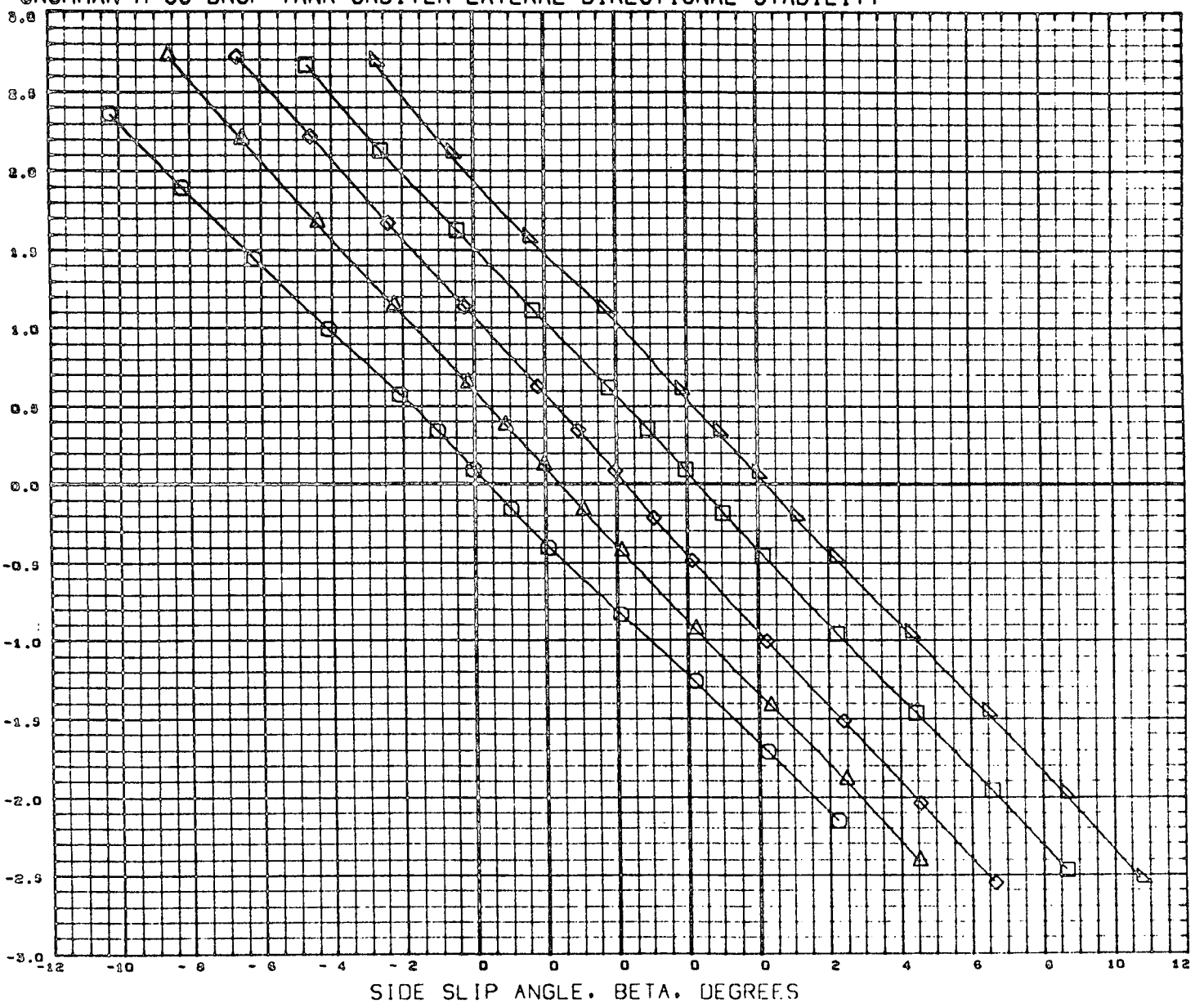
SYMBOL	MACH	PARAMETRIC VALUES	
○	1.959	ALPHA	0.000
△	3.480		
◇	4.959		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
○	0.596
△	0.895
◇	0.994
□	1.100
▽	1.190

PARAMETRIC VALUES

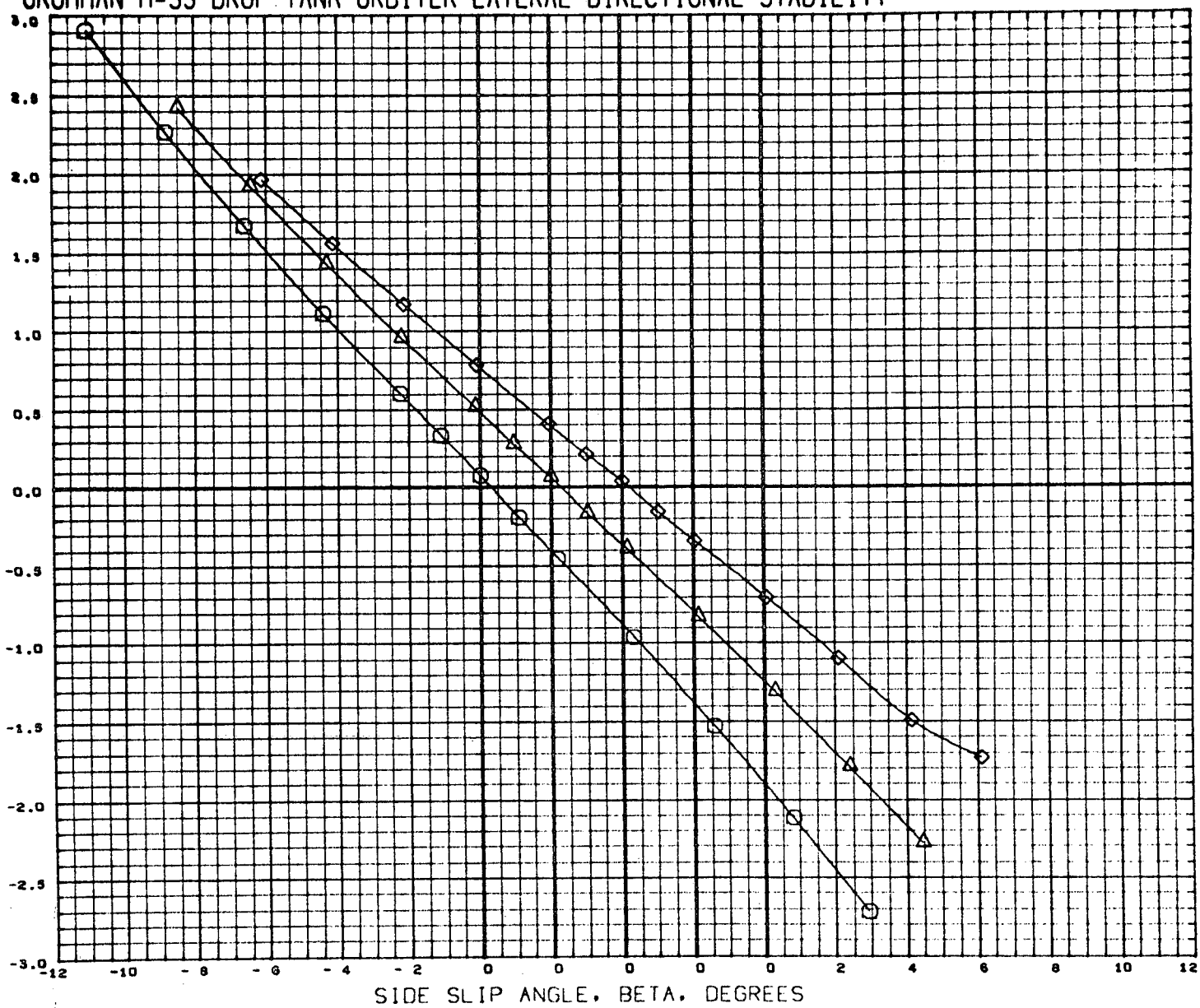
ALPHA 0.000

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



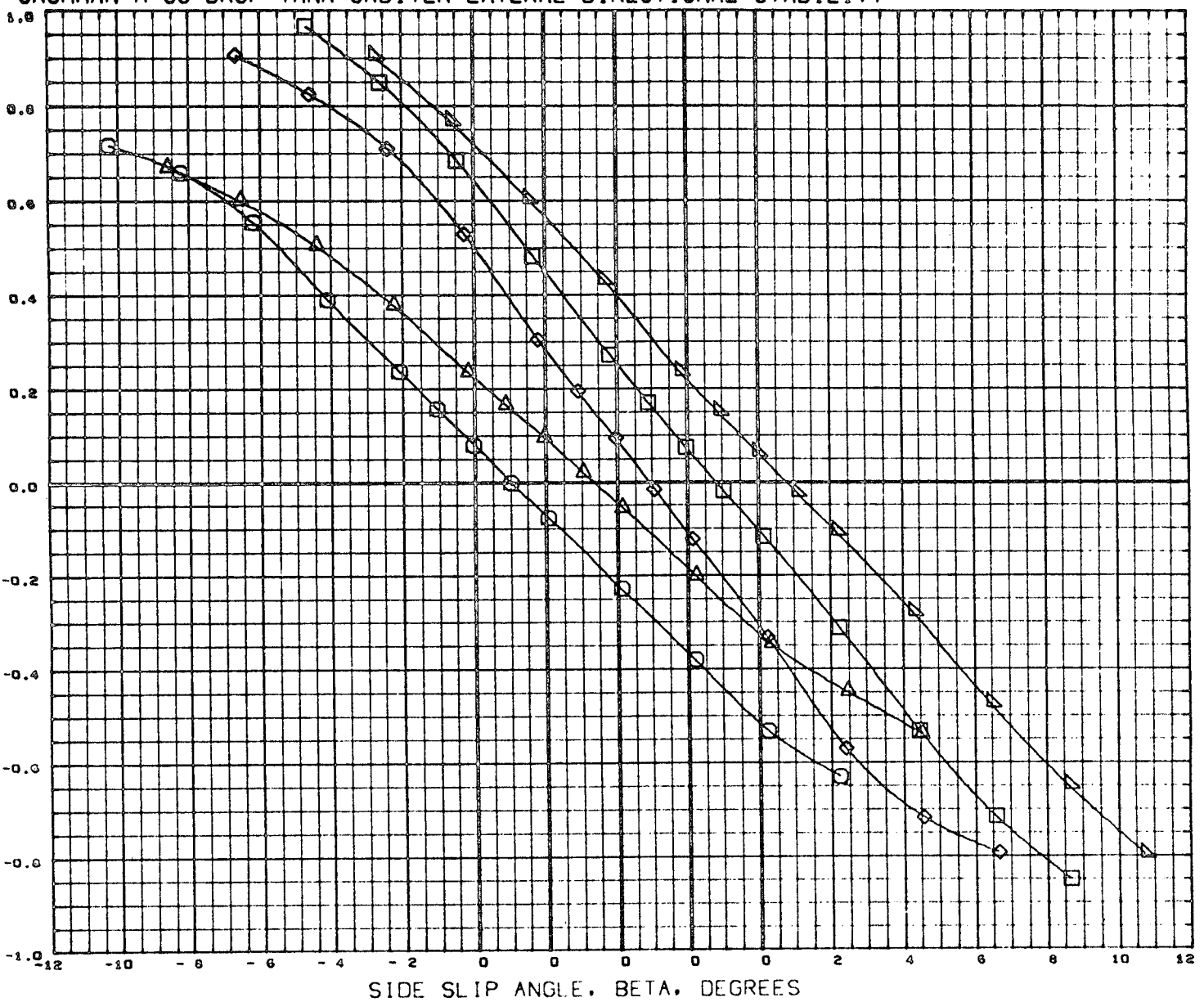
SYMBOL	MACH	PARAMETRIC VALUES	
○	1.959	ALPHA	0.000
△	3.480		
◇	4.959		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH
◁	0.596
□	0.695
◇	0.994
△	1.100
○	1.196

PARAMETRIC VALUES

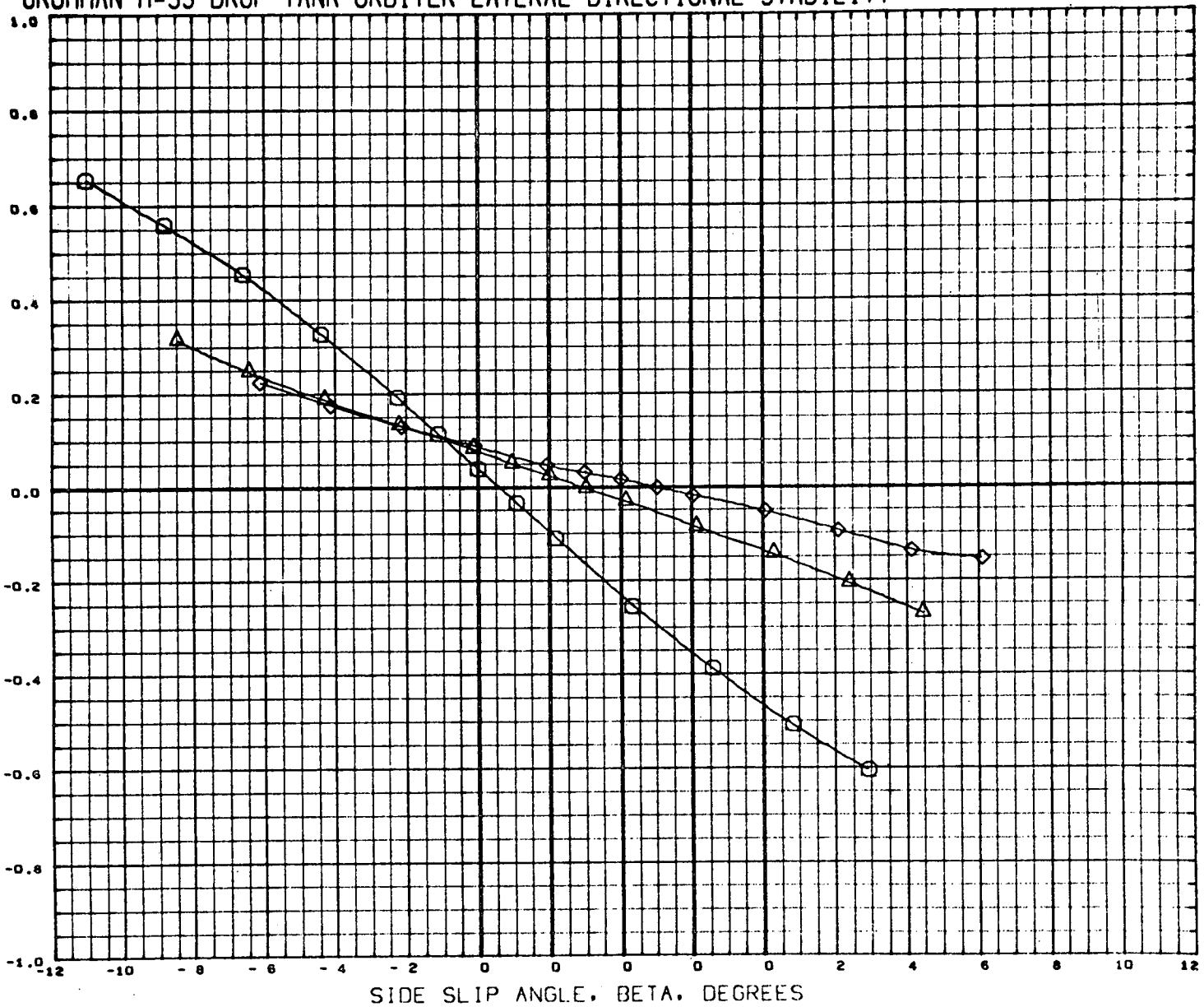
ALPHA 0.000

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES	
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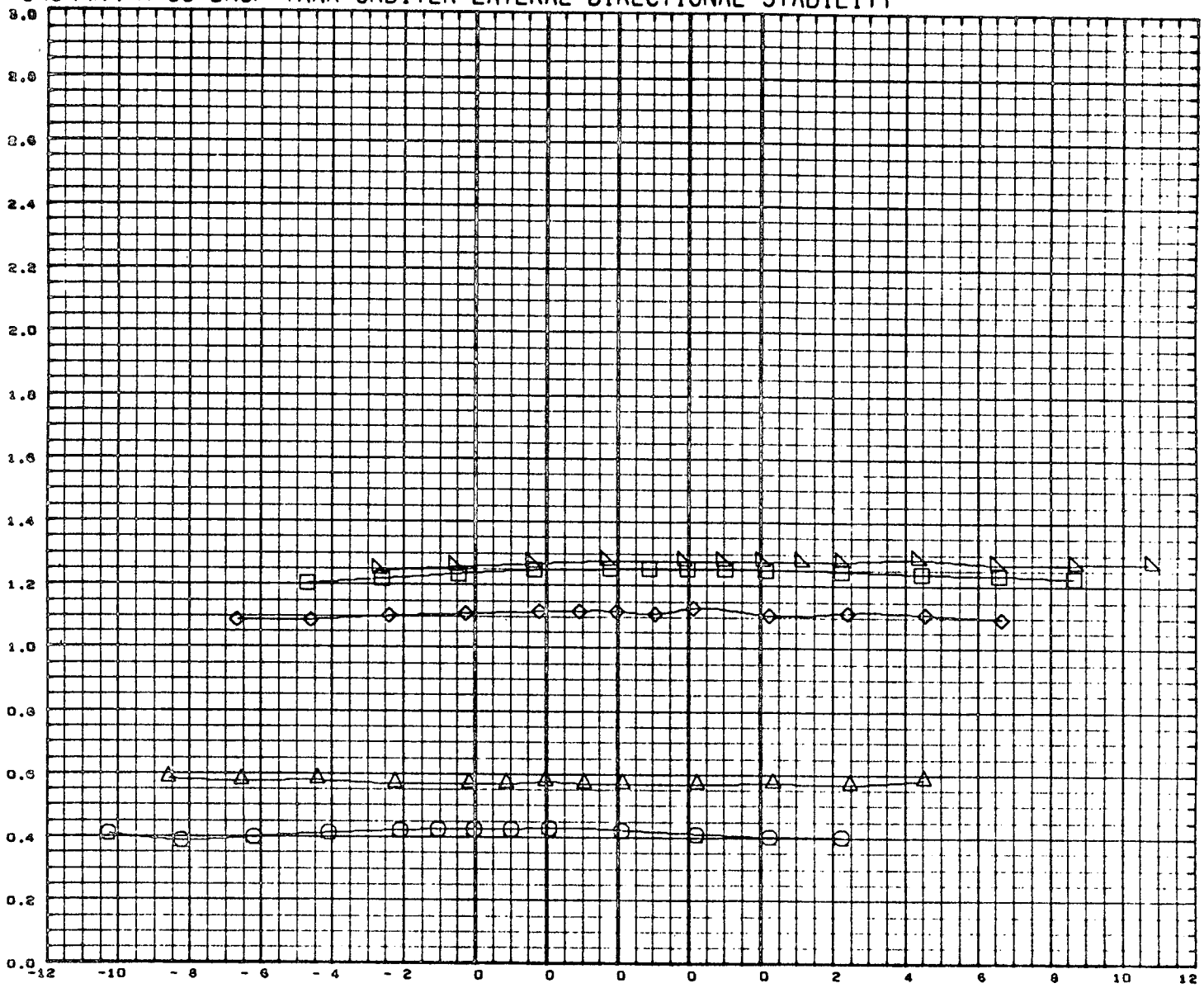
△	3.480		
◇	4.959		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



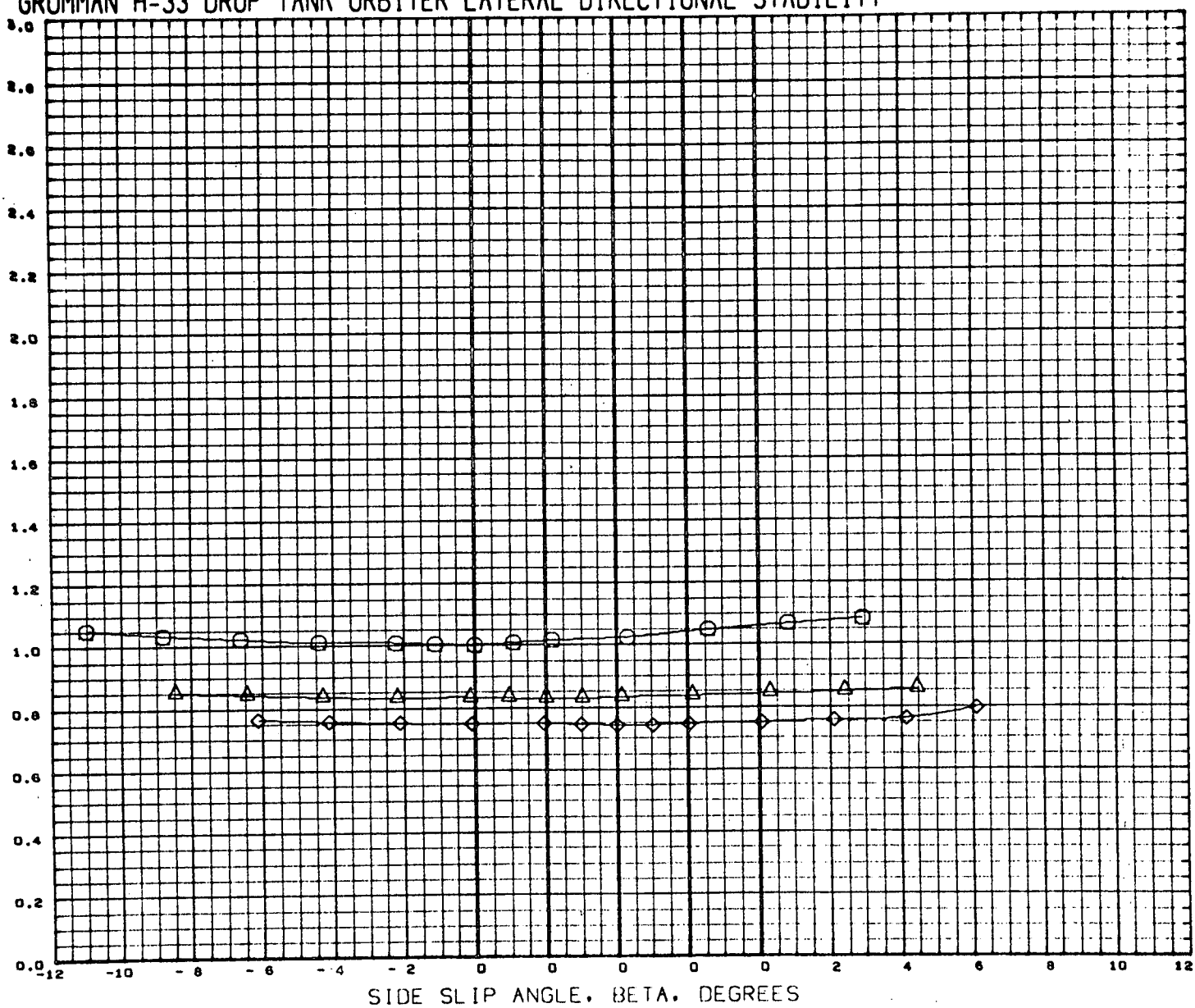
SYMBOL	MACH	PARAMETRIC VALUES	
	0.596	ALPHA	0.000
	0.695		
	0.994		
	1.100		
	1.196		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



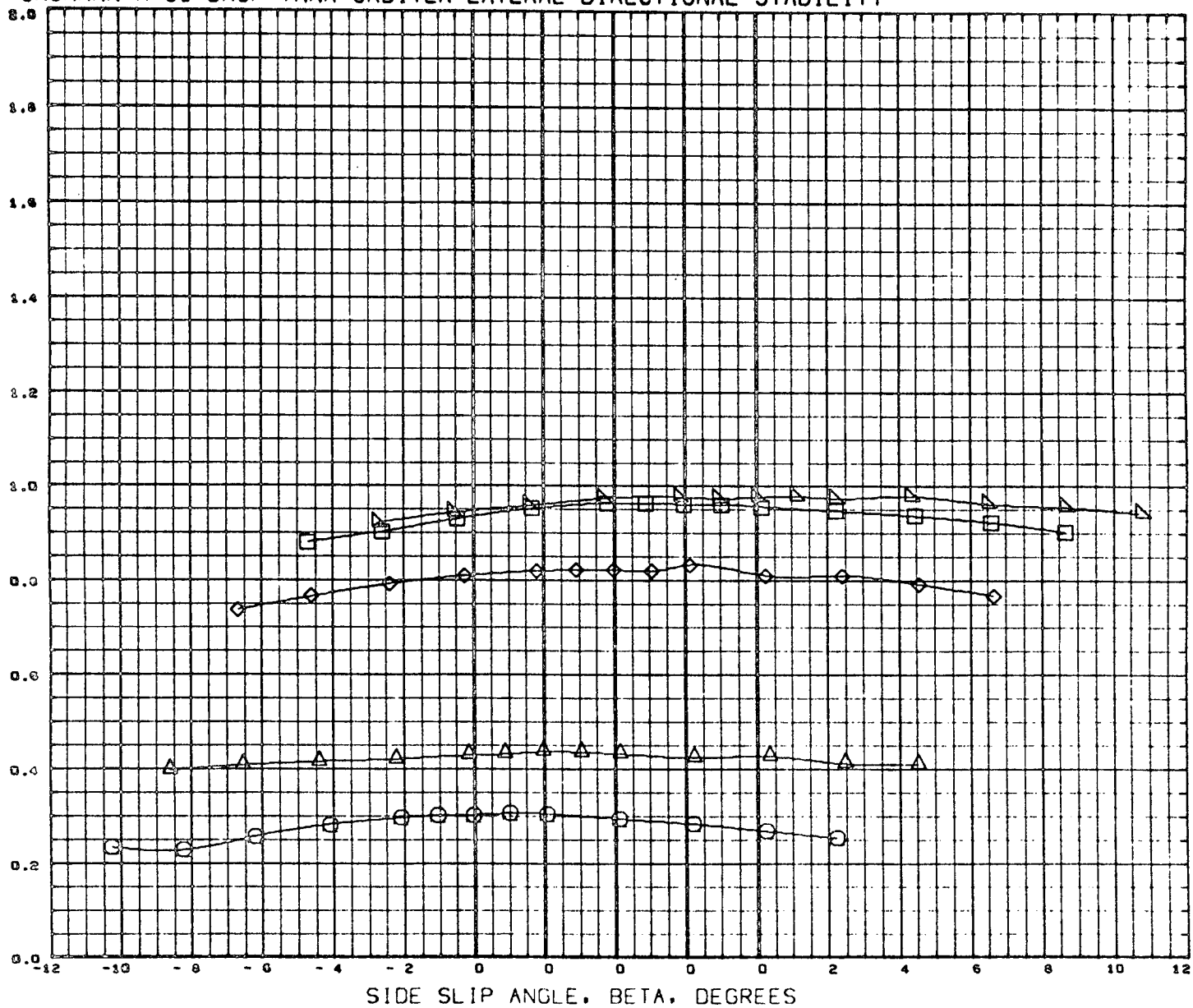
SYMBOL	MACH	PARAMETRIC VALUES	
○	1.959	ALPHA	0.000
△	3.480		
◇	4.959		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

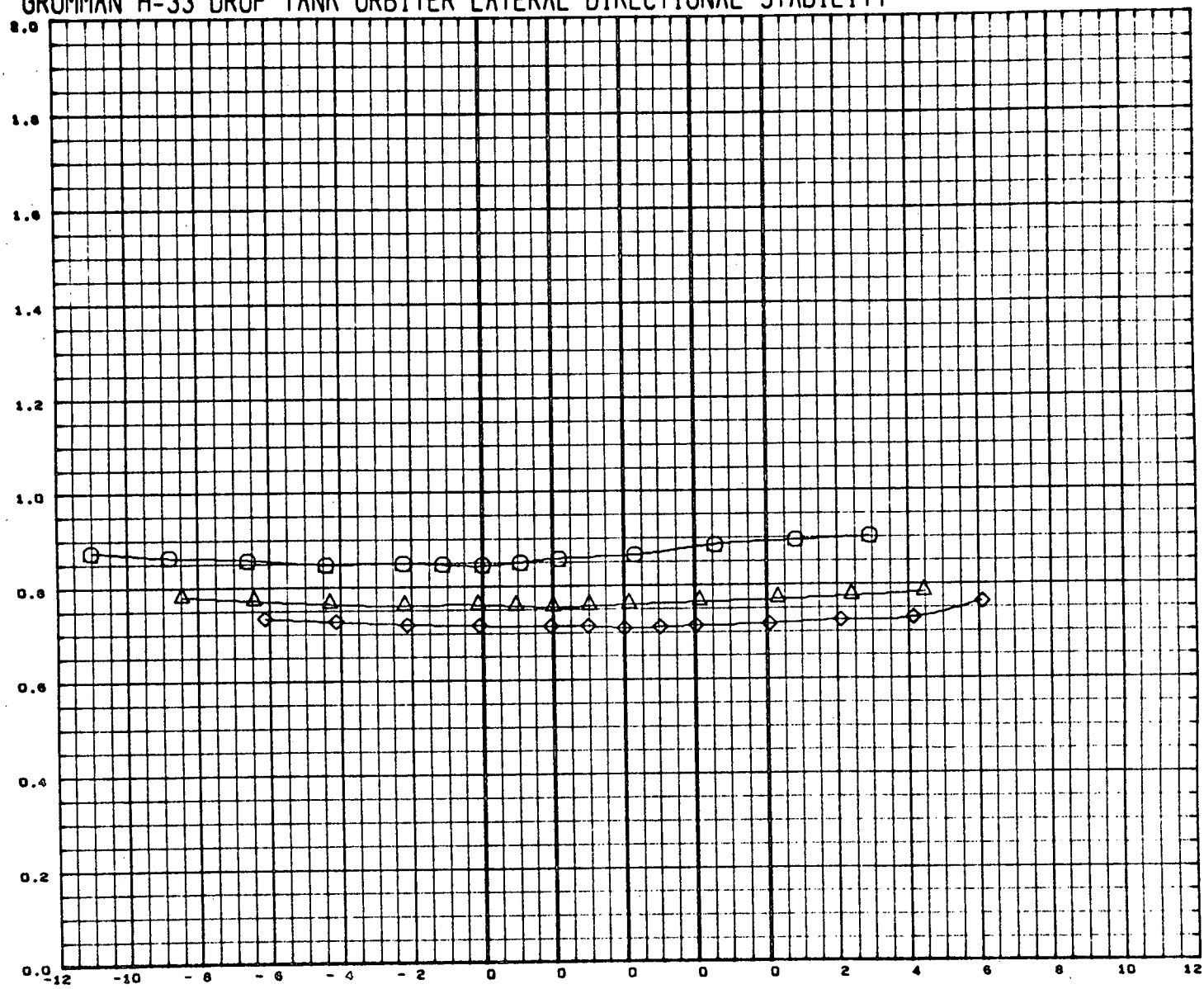


SYMBOL	MACH	PARAMETRIC VALUES	
○	0.596	ALPHA	0.000
△	0.895		
◇	0.994		
□	1.100		
▽	1.196		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



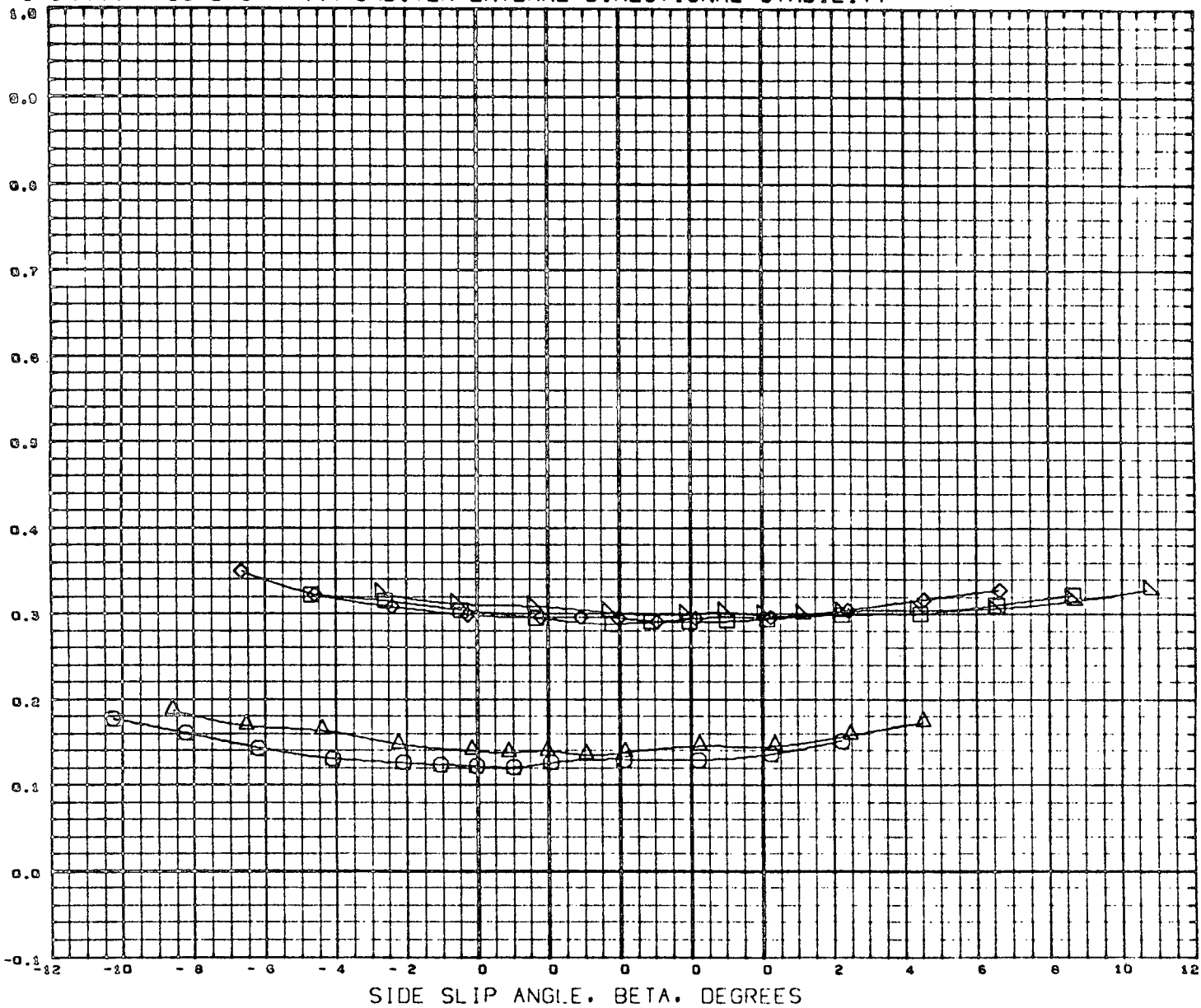
SYMBOL	MACH	PARAMETRIC VALUES	
○	1.959	ALPHA	0.000
△	3.480		
◇	4.959		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



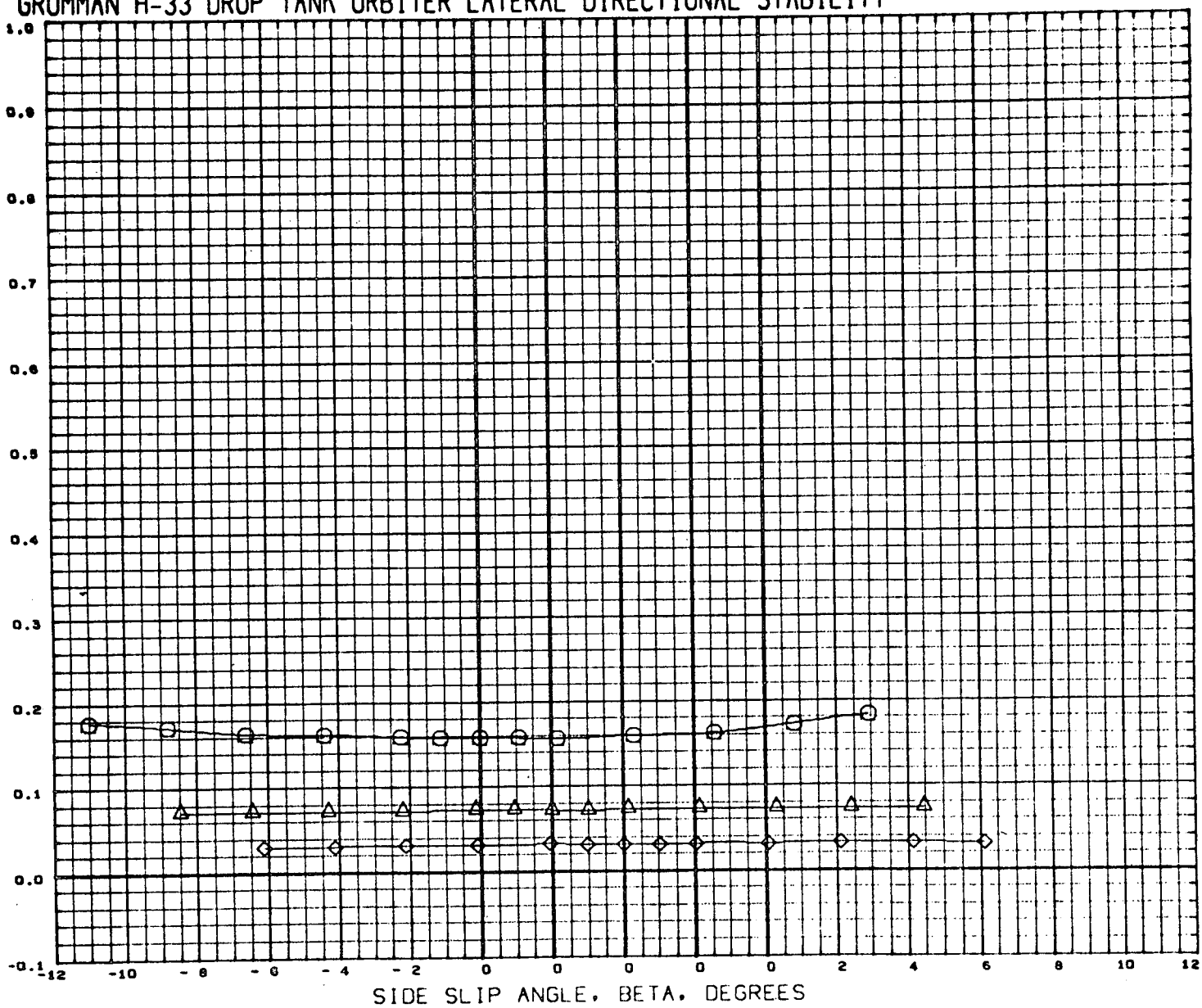
SYMBOL	MACH	PARAMETRIC VALUES	
○	0.596	ALPHA	0.000
△	0.895		
◇	0.994		
□	1.100		
▽	1.196		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



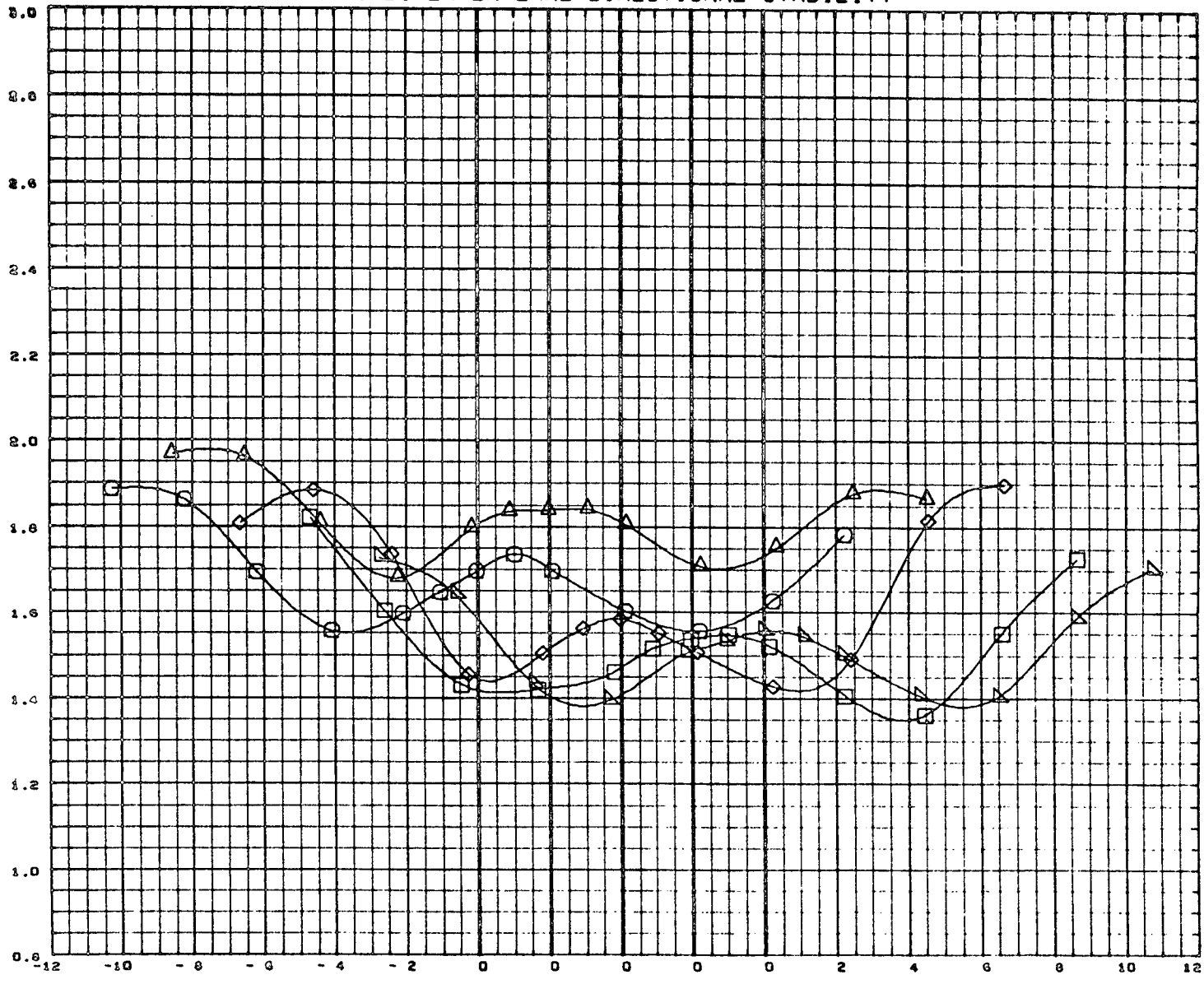
SYMBOL	MACH	PARAMETRIC VALUES	
○	1.959	ALPHA	0.000
△	3.480		
◇	4.959		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



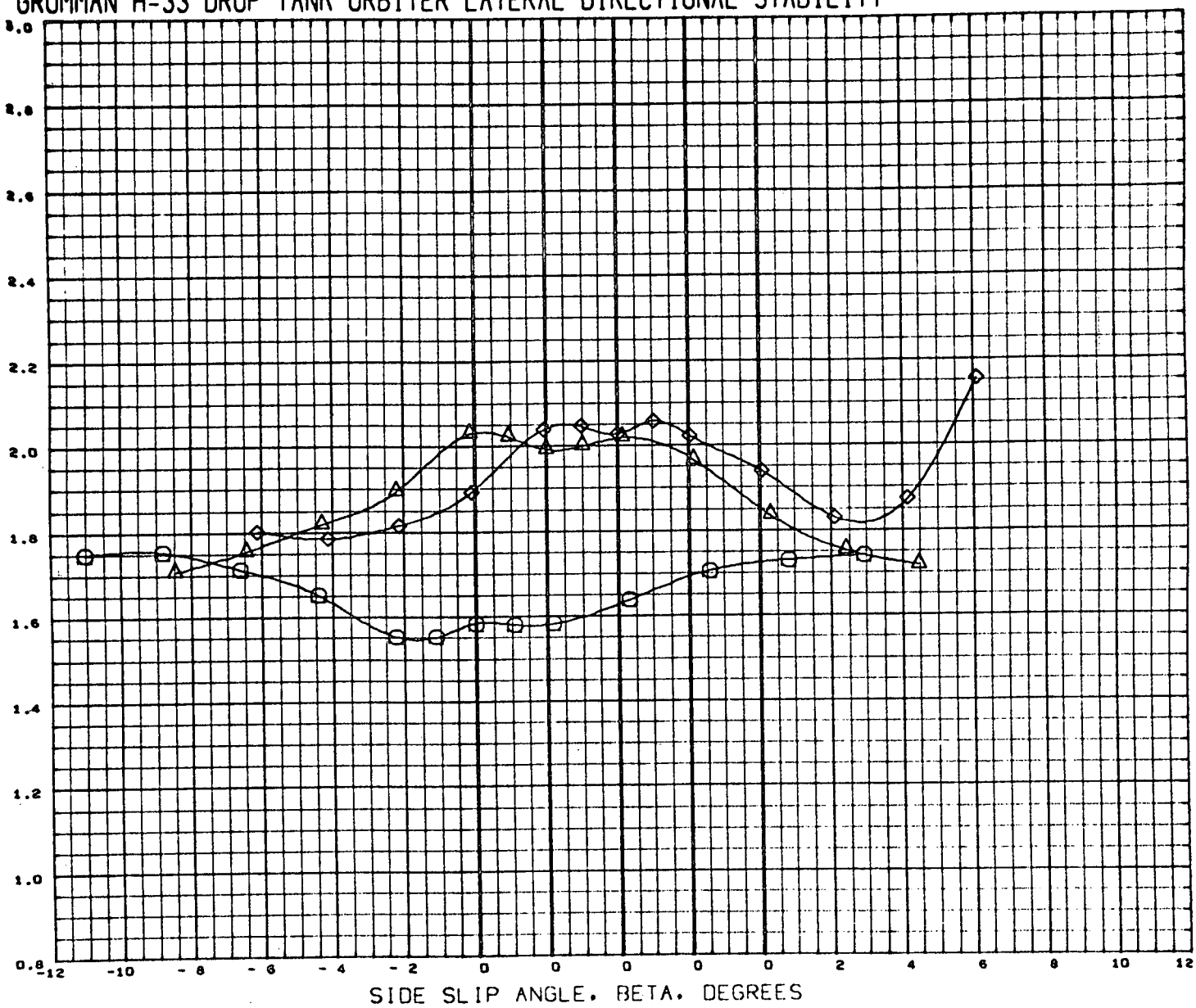
SYMBOL	MACH	PARAMETRIC VALUES	
△	0.596	ALPHA	0.000
□	0.895		
◇	0.994		
▽	1.100		
○	1.190		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



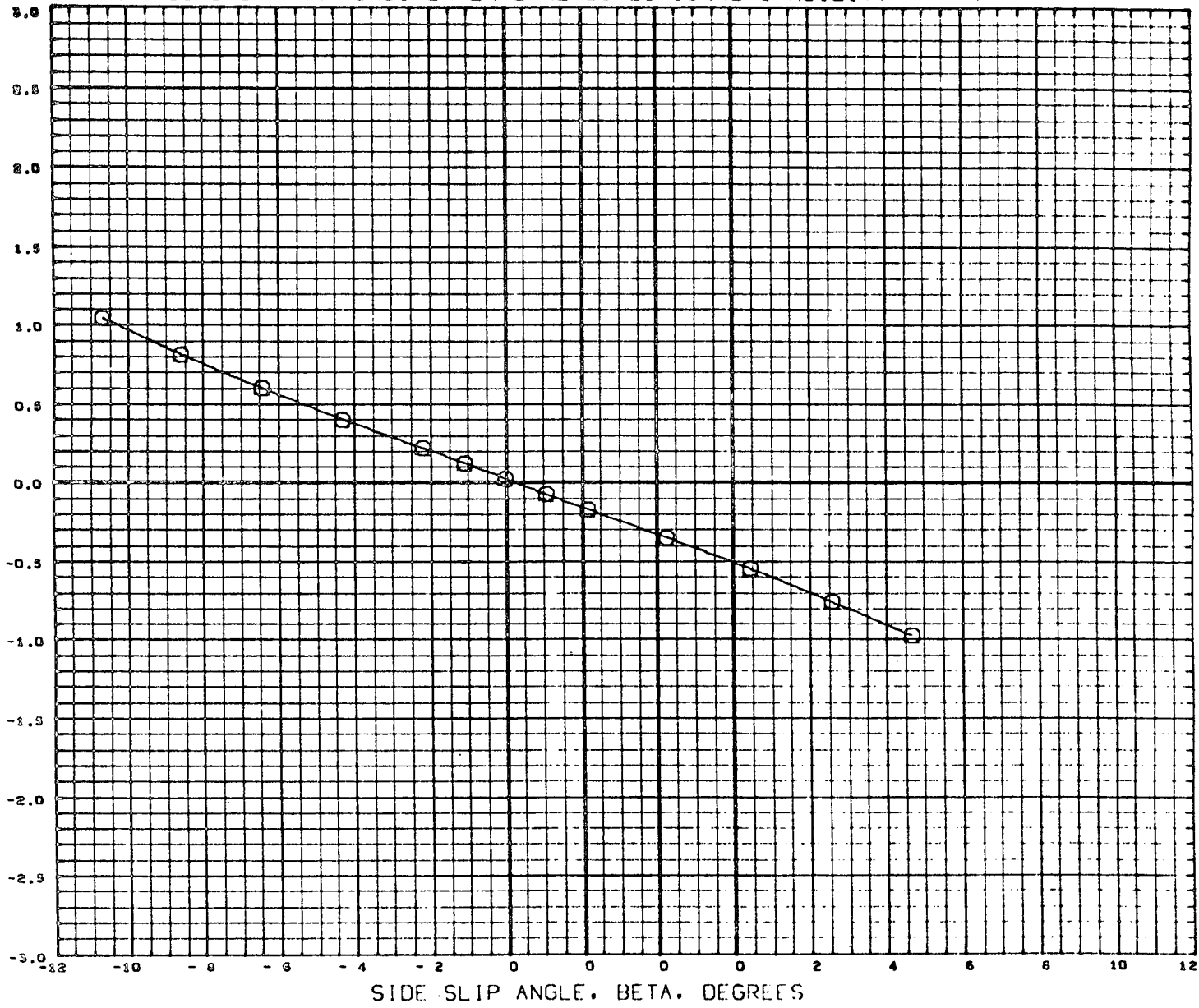
SYMBOL	MACH	PARAMETRIC VALUES	
○	1.959	ALPHA	0.000
△	3.480		
◇	4.959		

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.3070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES
○	3.196	ALPHA	0.000

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

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LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

C. 6

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

SYMBOL	MACH		PARAMETRIC VALUES
○	1.196	ALPHA	0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

SYMBOL	MACH	PARAMETRIC VALUES	
○	1.196	ALPHA	0.000

DATA HIST. CODE CCCGC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

SYMBOL MACH PARAMETRIC VALUES

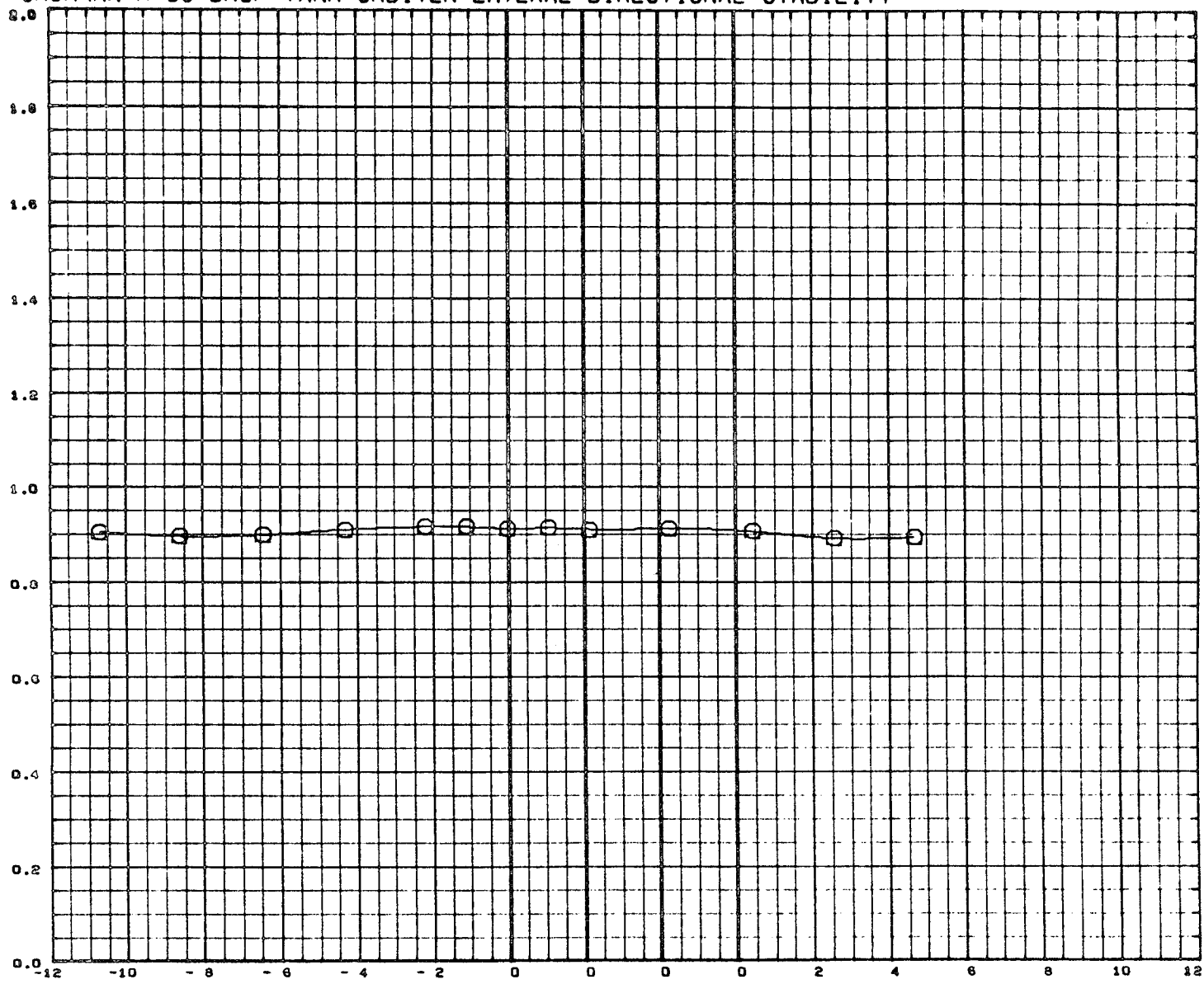
○ 1.196 ALPHA 0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.3070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH		PARAMETRIC VALUES
○	1.196	ALPHA	0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.3070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

SYMBOL ○ MACH 1.196 ALPHA PARAMETRIC VALUES 0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

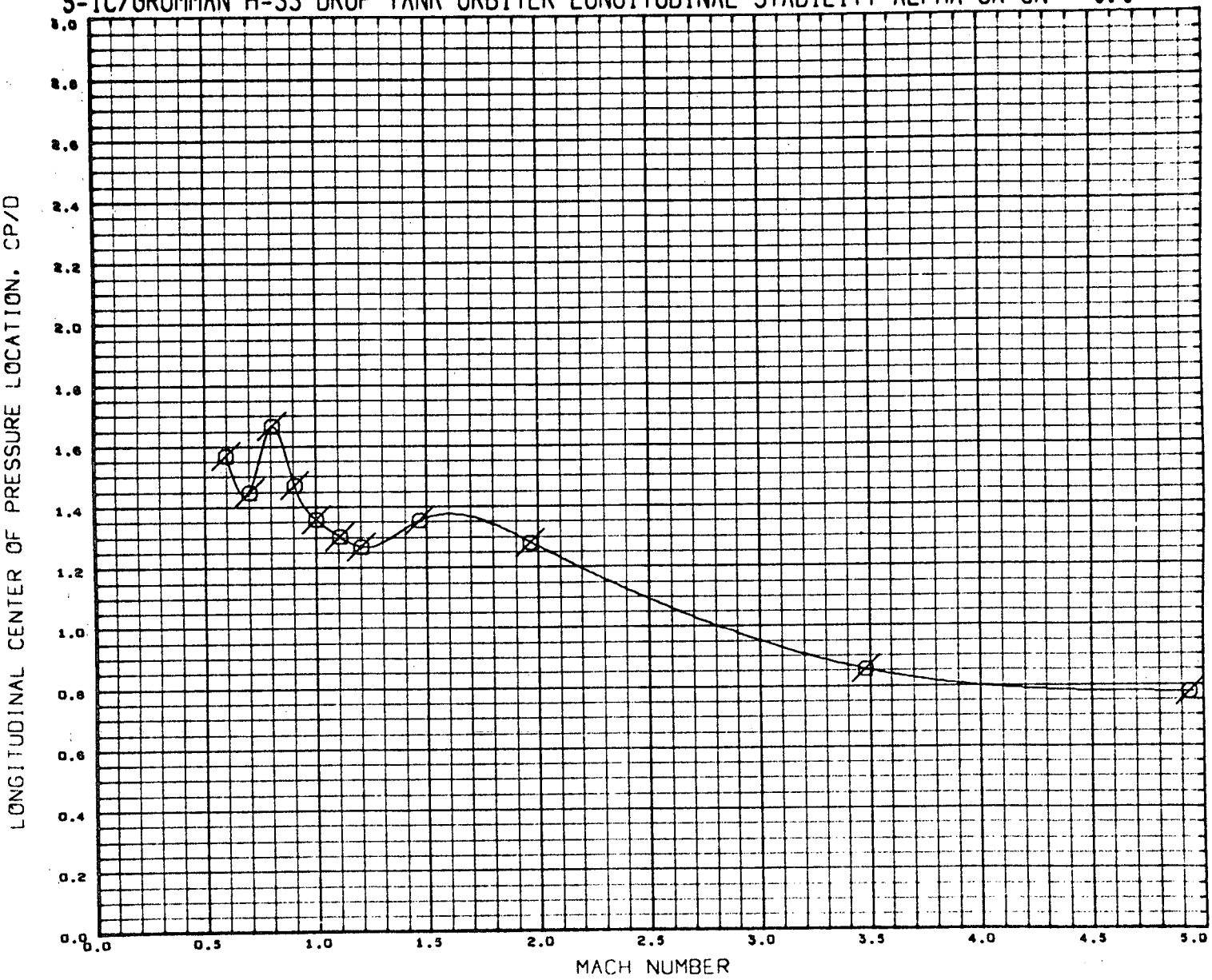
SYMBOL	MACH		PARAMETRIC VALUES
○	1.196	ALPHA	0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

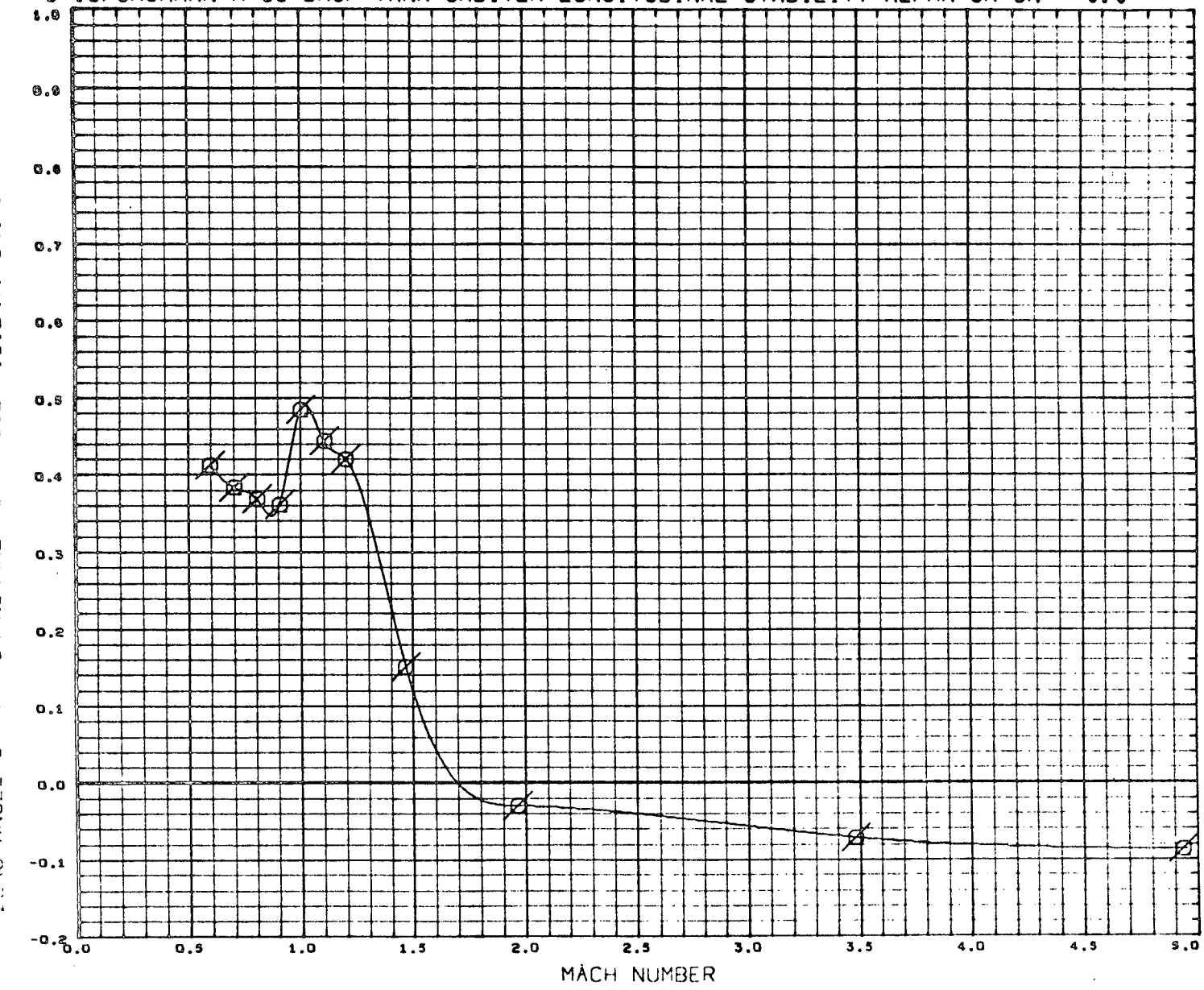
BETA	0.000	PHI	0.000
WNGINC	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

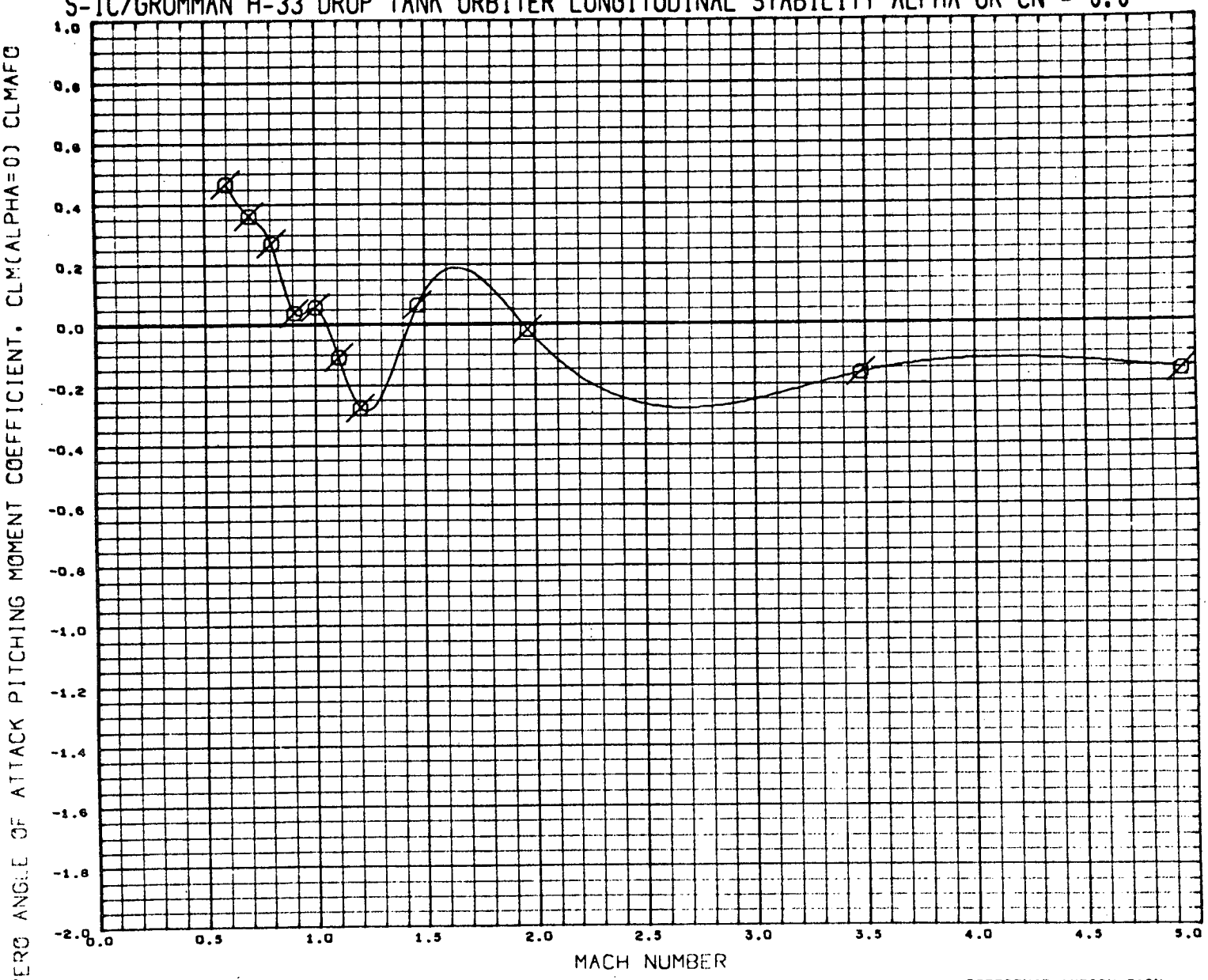
BETA	0.000	PHI	0.000
WNGINC	0.000		

DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

BETA	0.000	PHI	0.000
WNGINC	0.000		

REFERENCE INFORMATION

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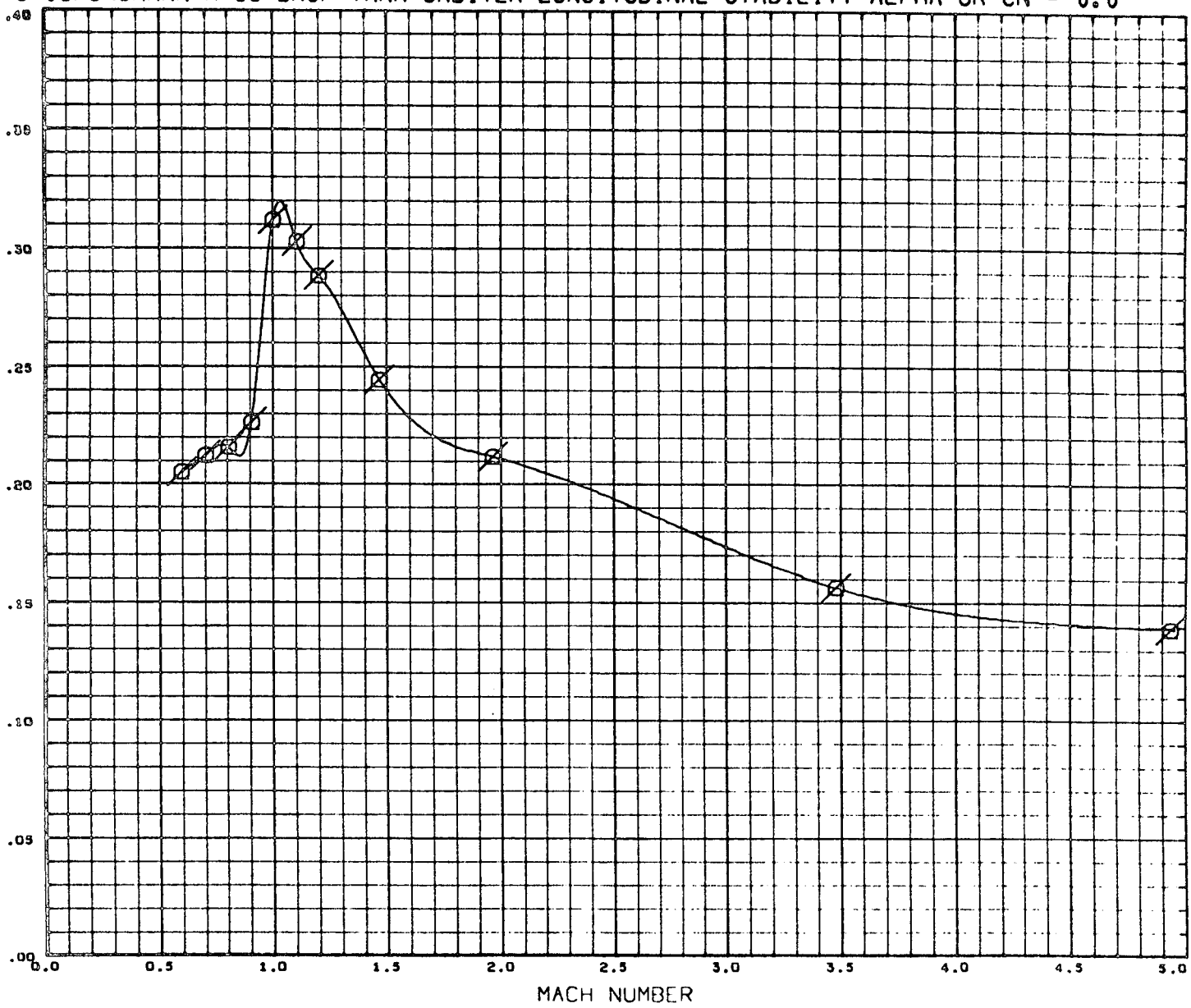
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

BETA	0.000	PHI	0.000
WNGINC	0.000		

DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

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BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
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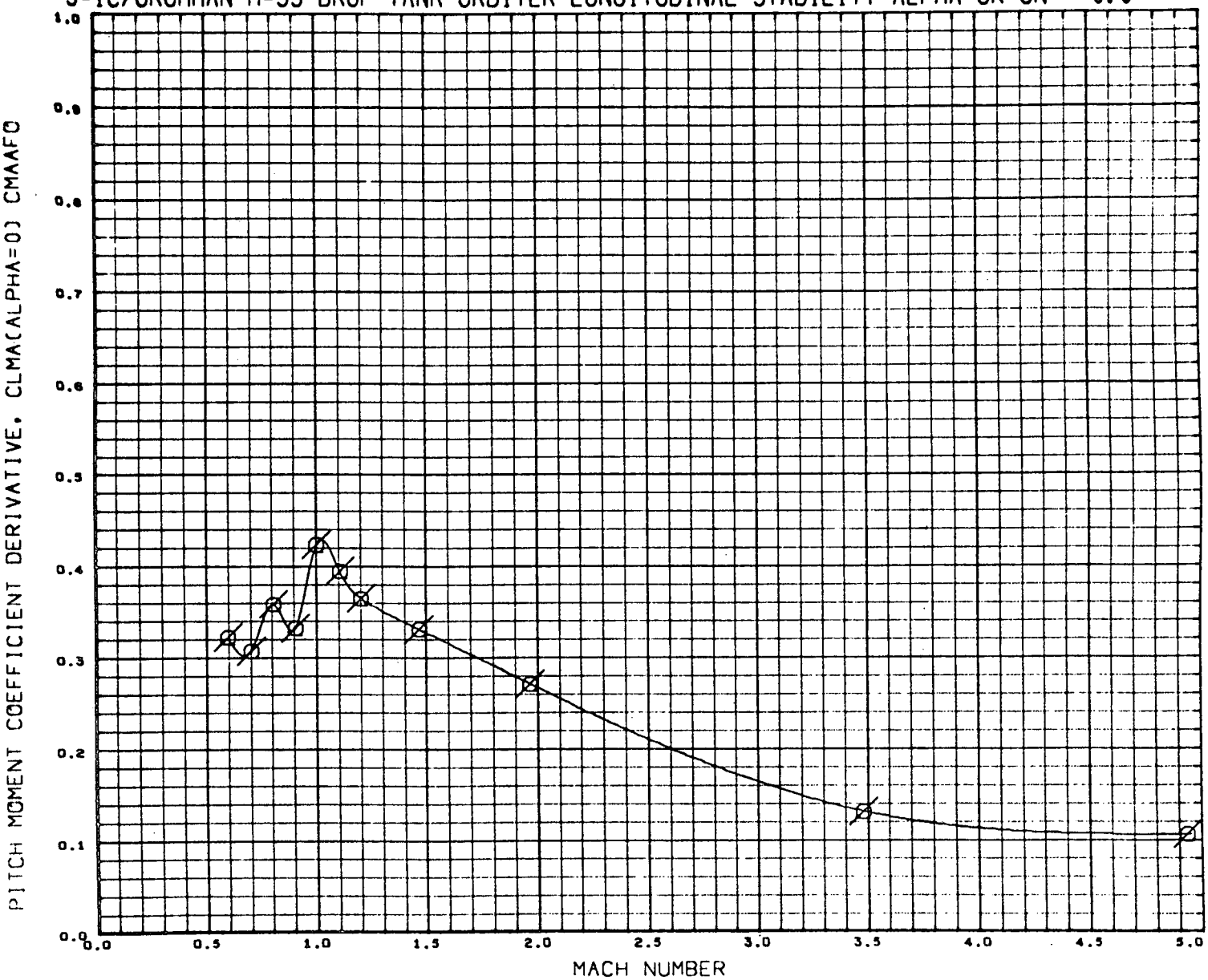
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

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ZMRP	0.0000	IN.
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DATA HIST. CODE CCCGCF

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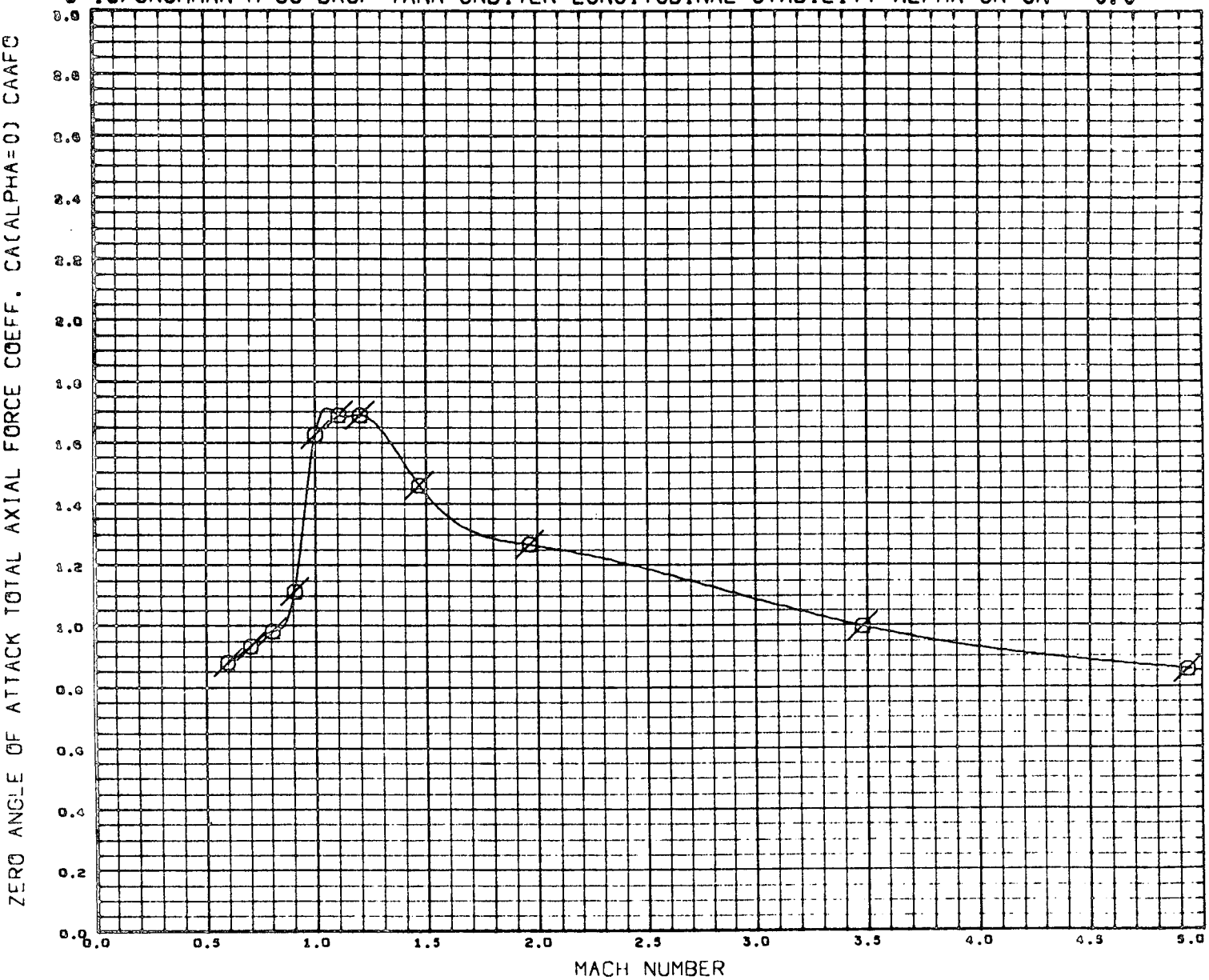

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WNGINC	0.000		

REFERENCE INFORMATION

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BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
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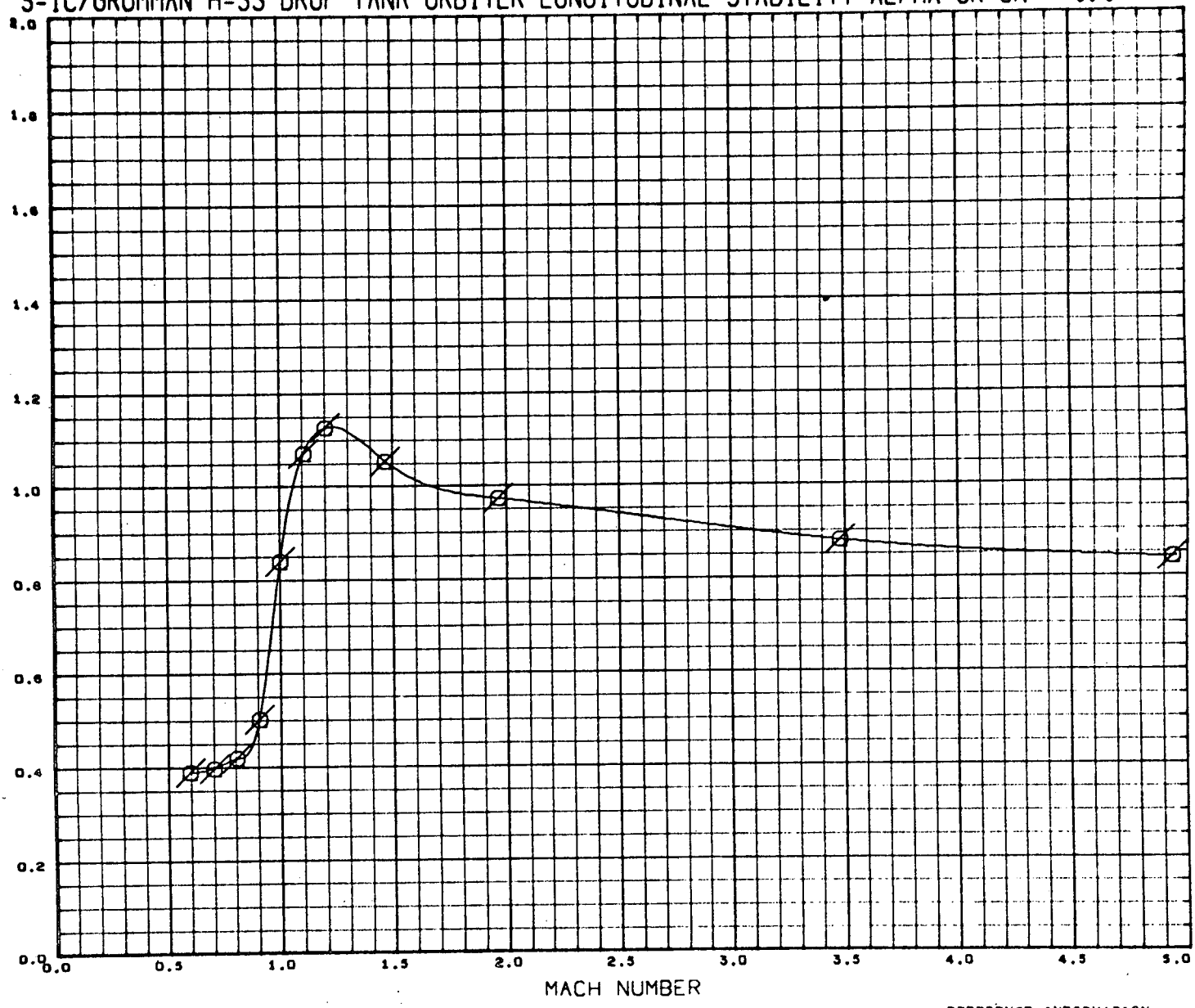
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

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WNGINC	0.000		

DATA HIST. CODE CCCGCF

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XMRP	5.3990	IN.
YMRP	0.0000	IN.
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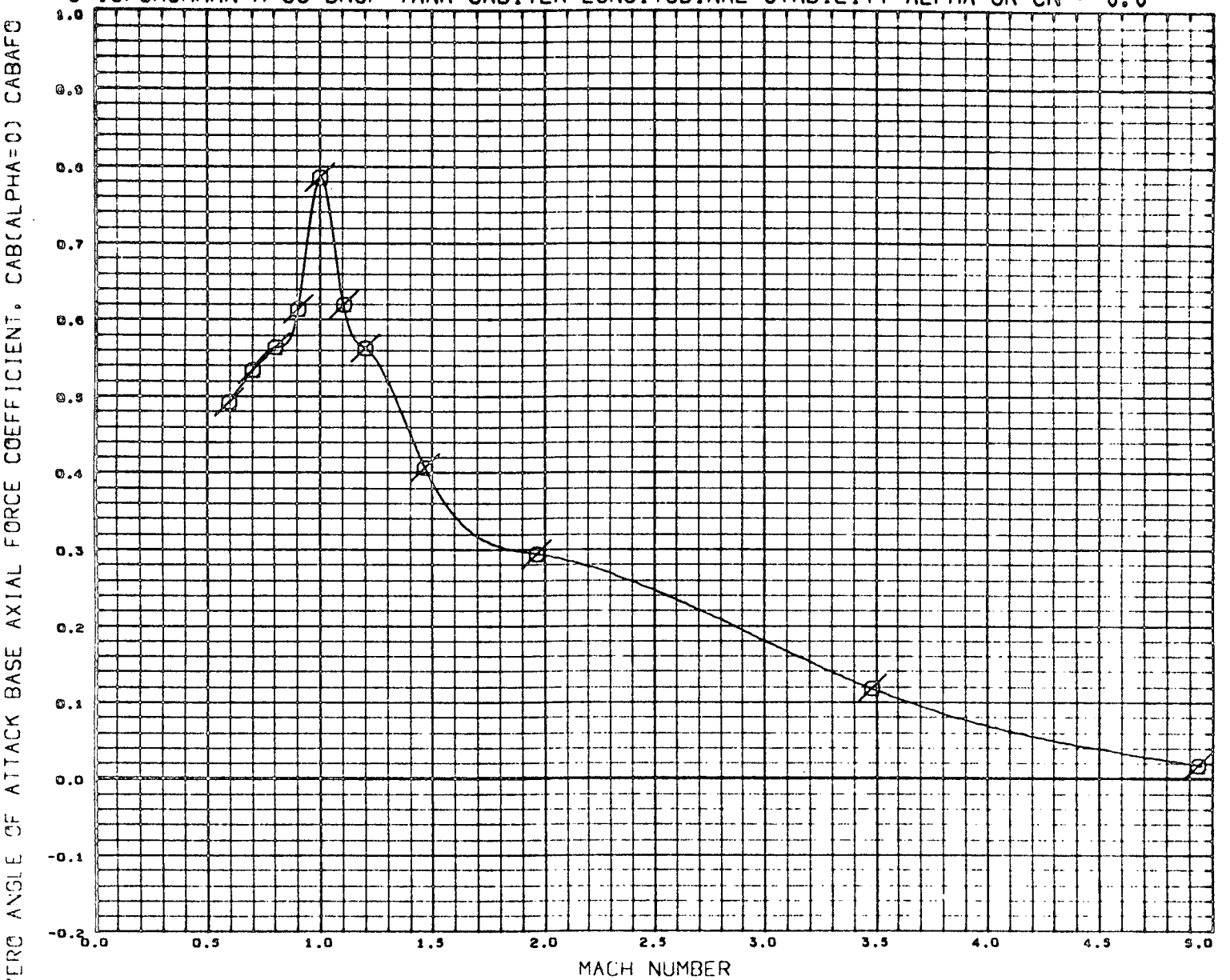
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

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WNGINC	0.000		

REFERENCE INFORMATION

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XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
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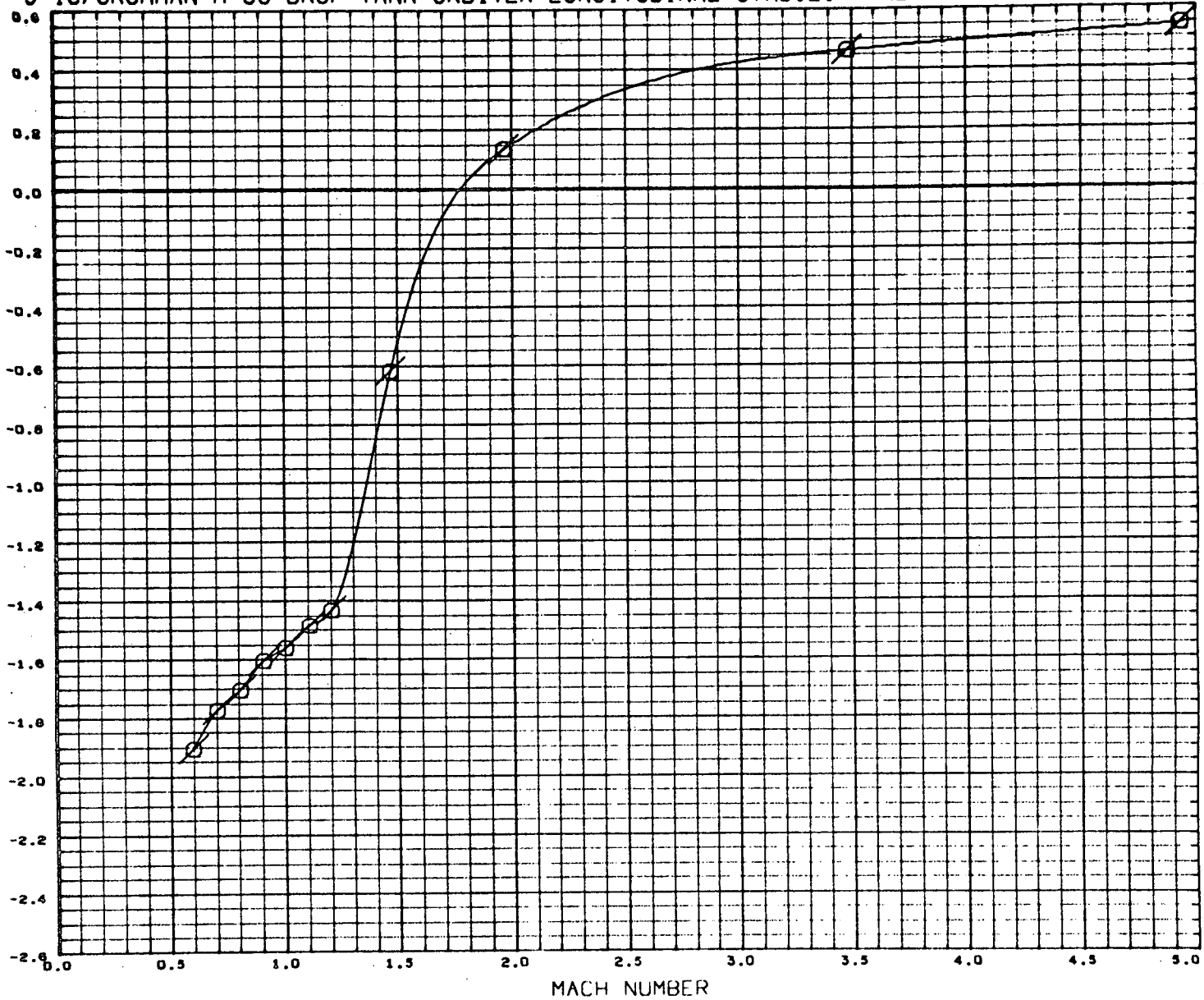
DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

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WNGINC	0.000		

DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

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LREF	1.3330	IN.
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YMRP	0.0000	IN.
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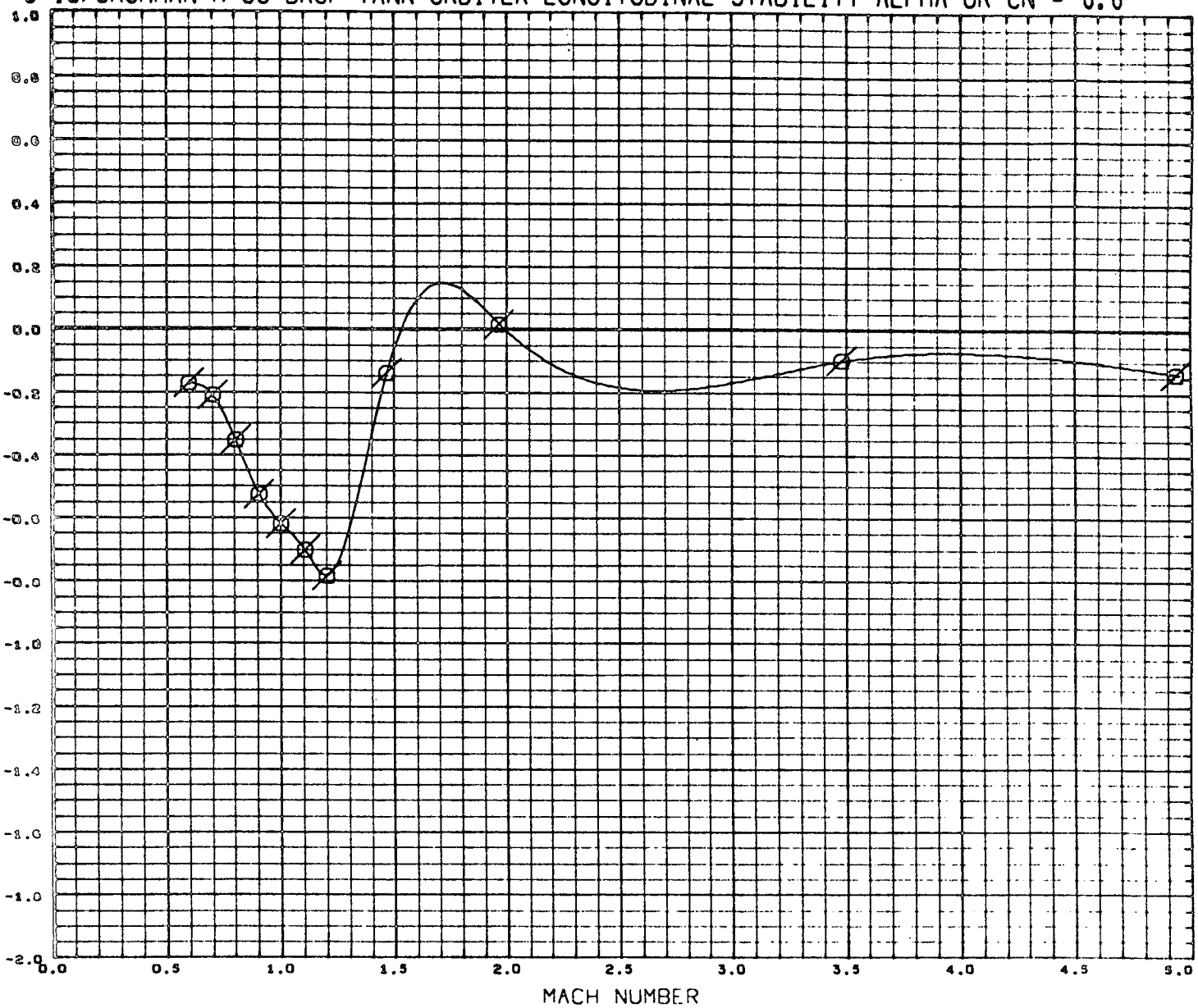
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

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DATA HIST. CODE CCCGCF

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BREF	1.3330	IN.
XMRP	5.3990	IN.
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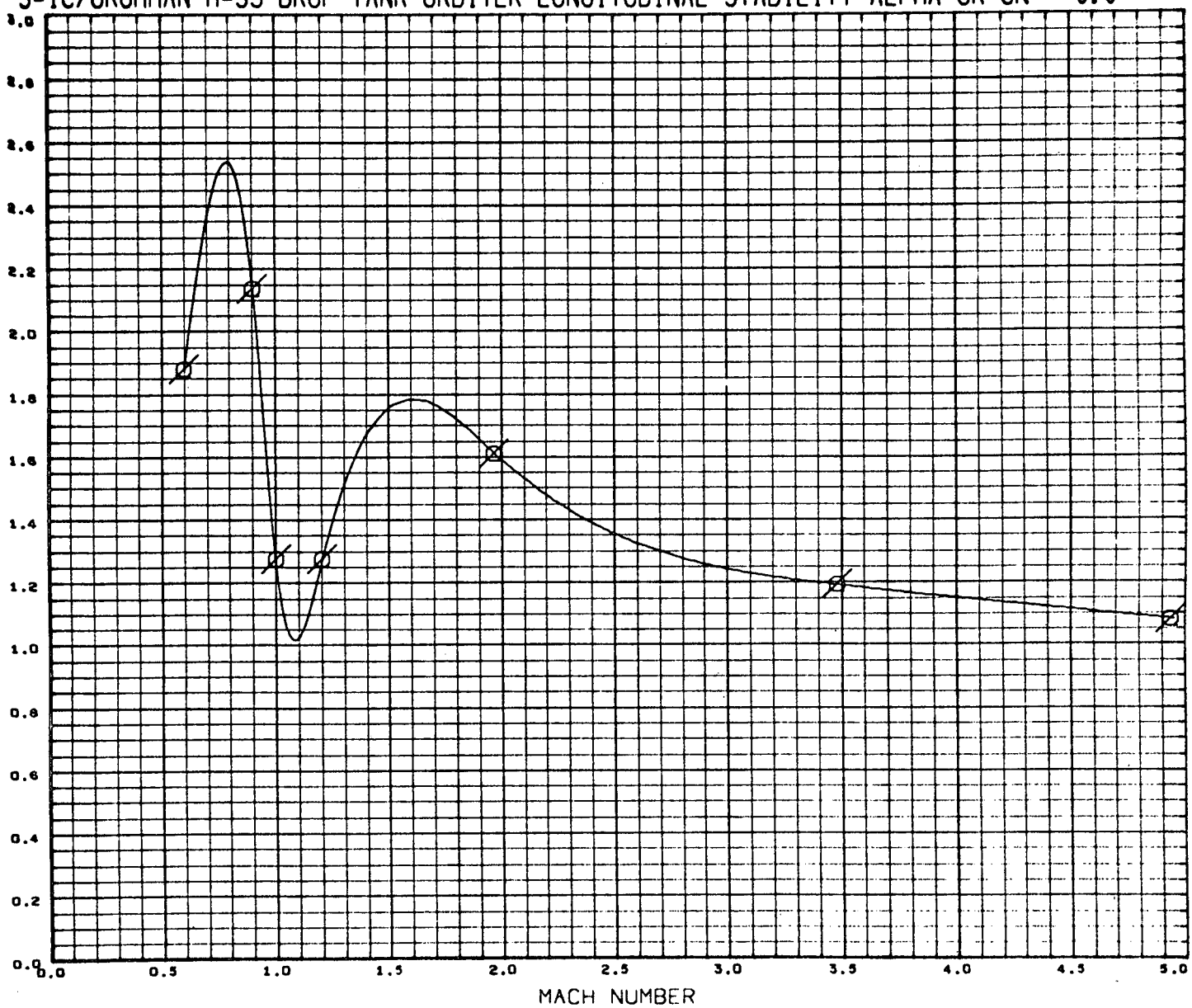
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

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WNGIN	0.000		

REFERENCE INFORMATION

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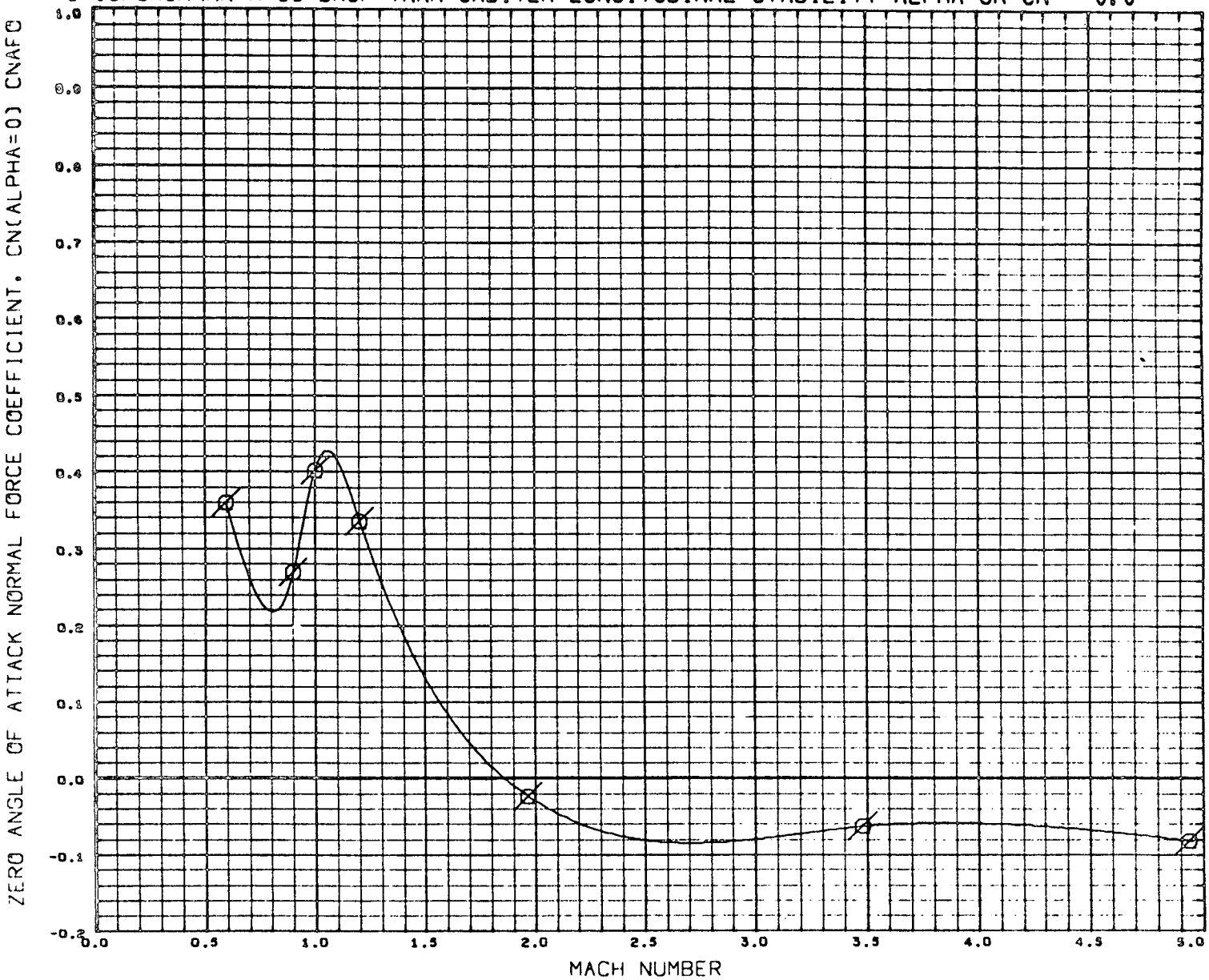
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

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WNGIN	0.000		

REFERENCE INFORMATION

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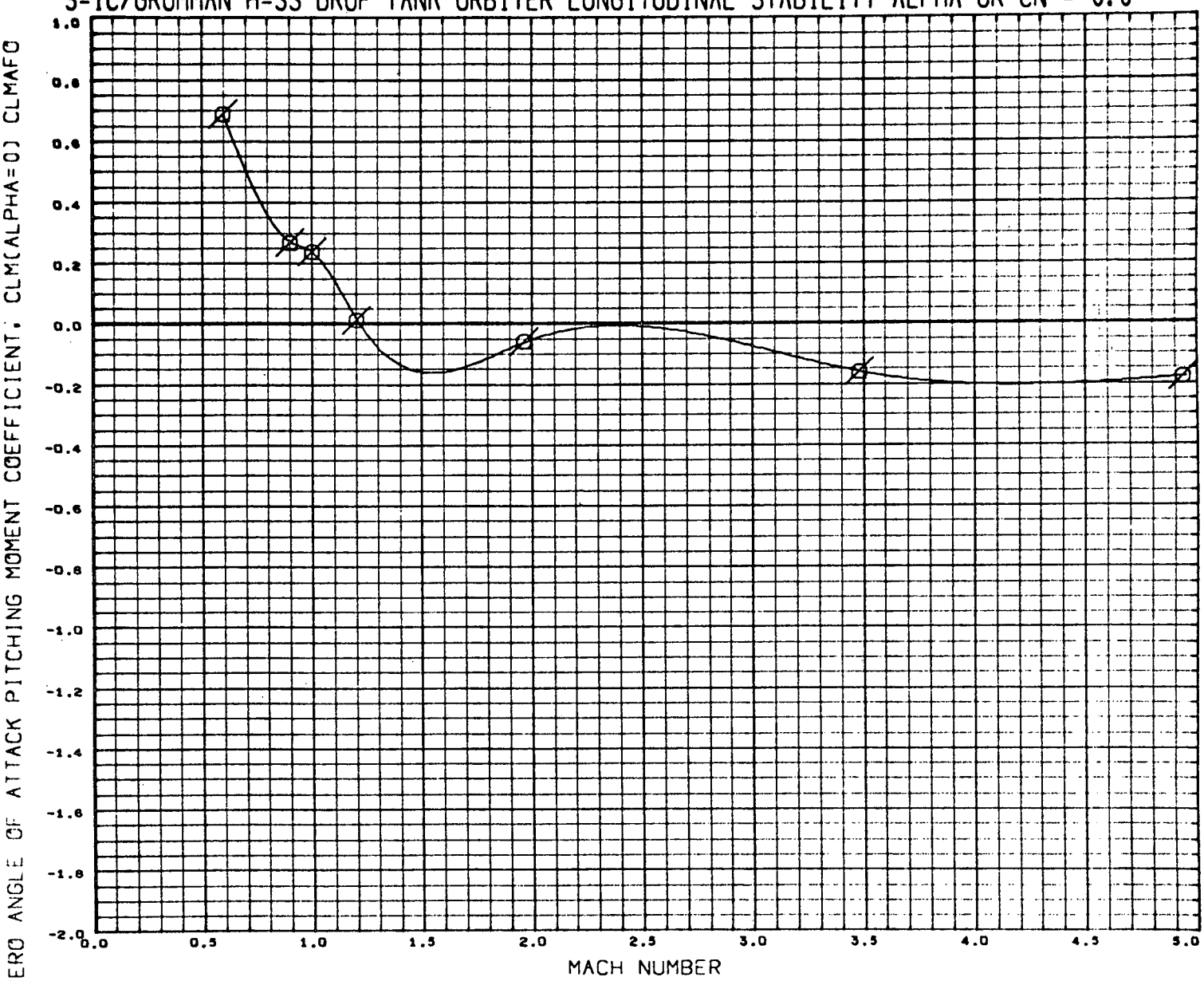
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

BETA	0.000	PHI	0.000
WNGIN	0.000		

REFERENCE INFORMATION

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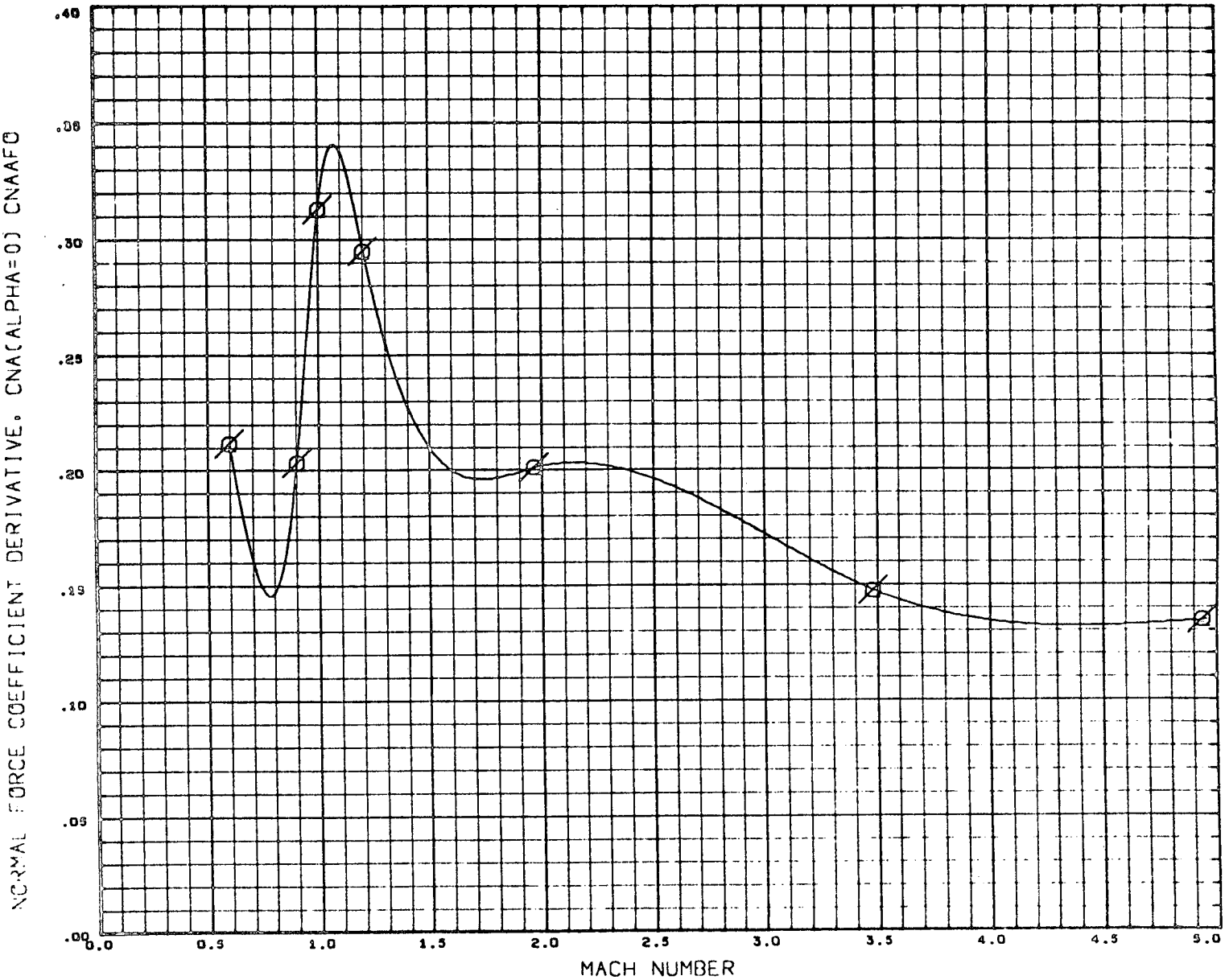
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

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REFERENCE INFORMATION

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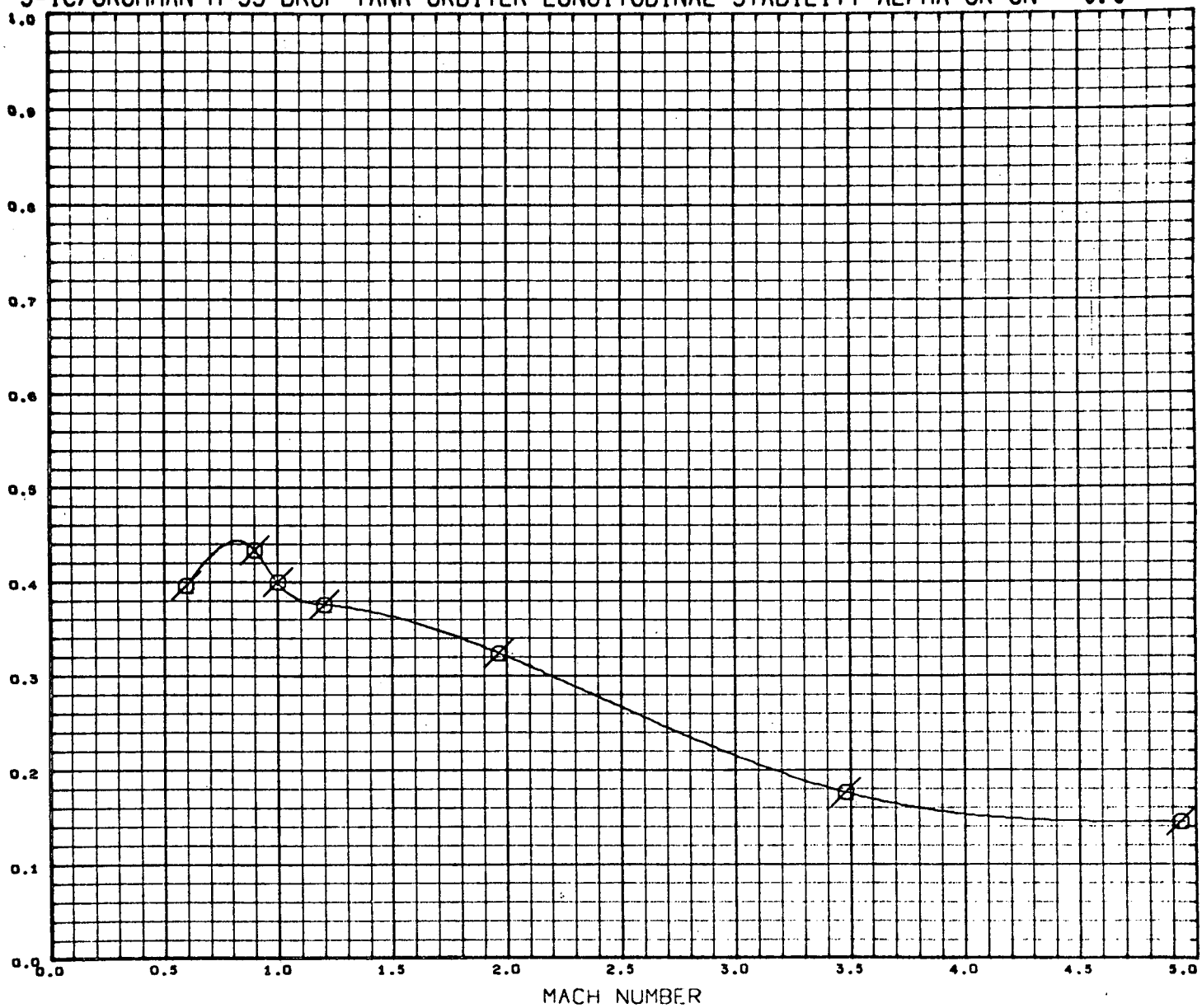
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

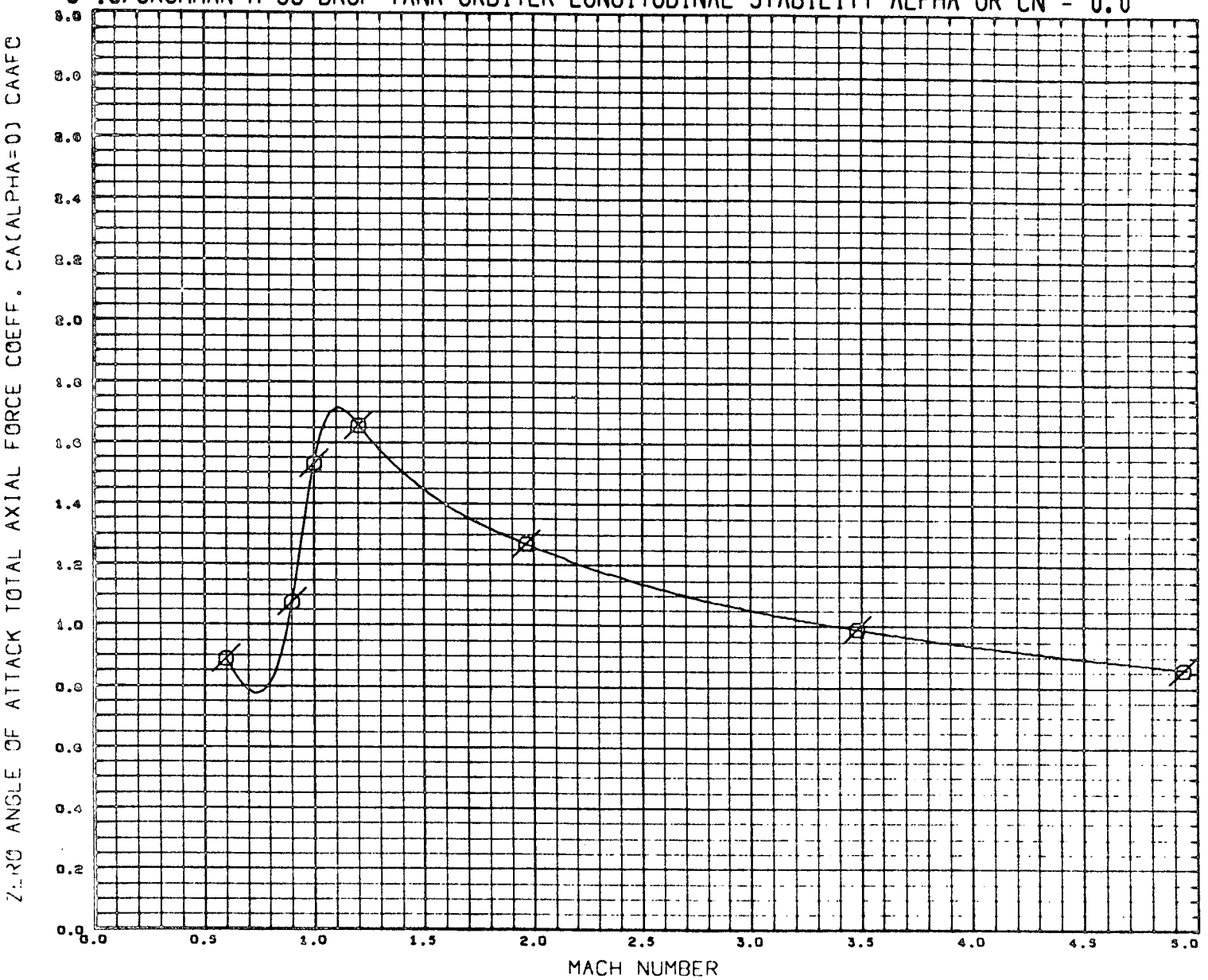
BETA	0.000	PHI	0.000
WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-IC/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

BETA	0.000	PHI	0.000
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REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

PARAMETRIC VALUES

BETA	0.000	PHI	0.000
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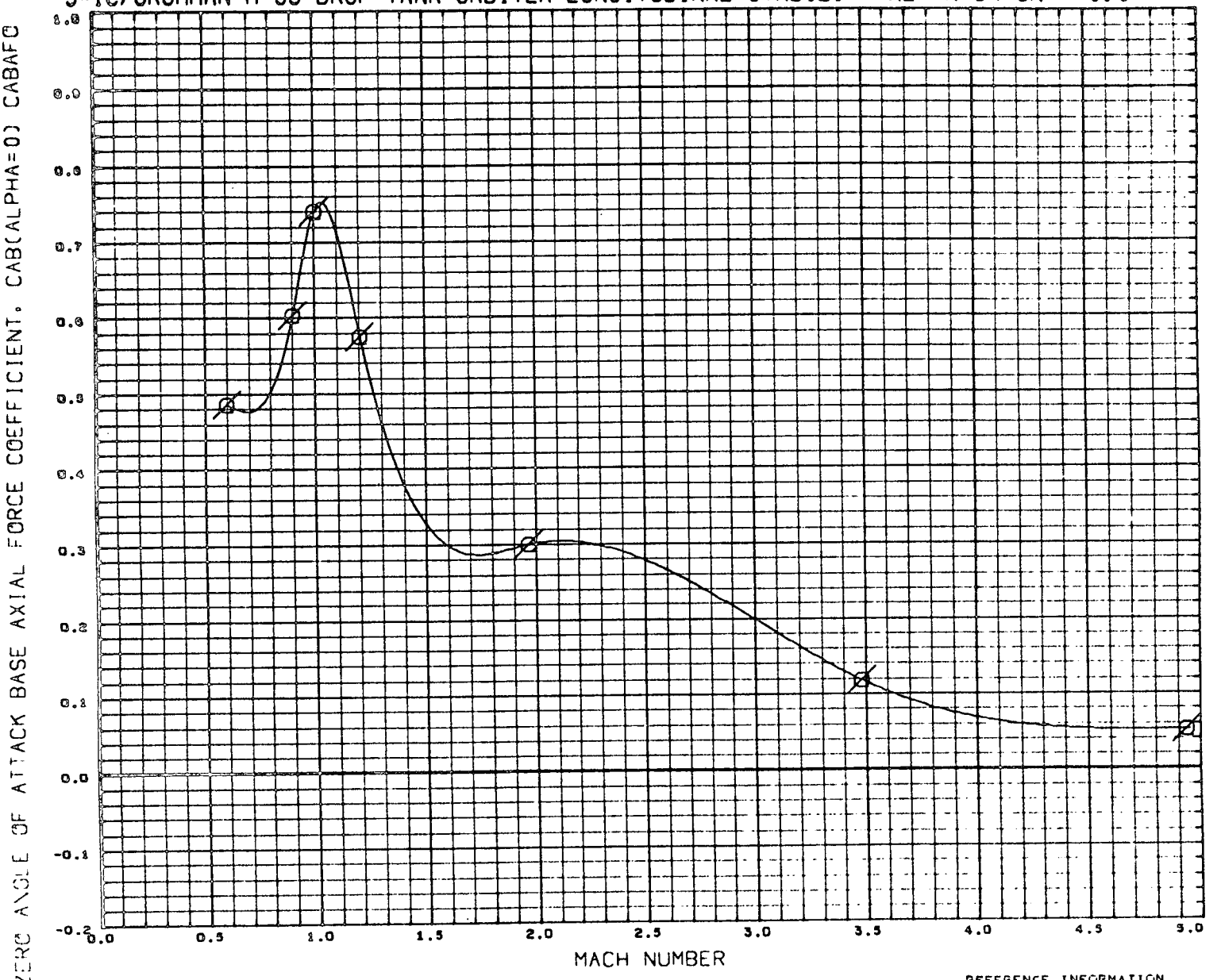
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

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WNGIN	0.000		

REFERENCE INFORMATION

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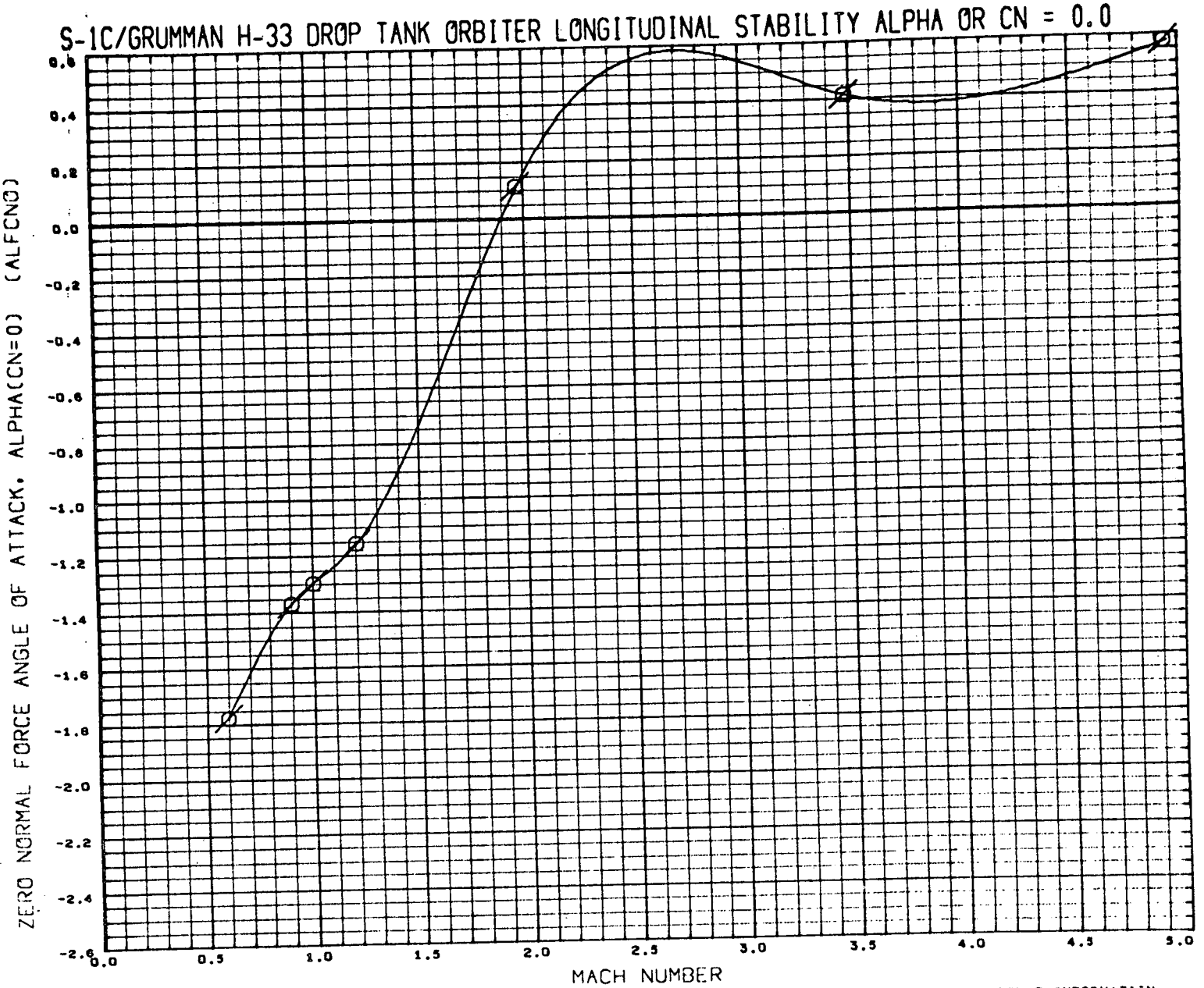
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

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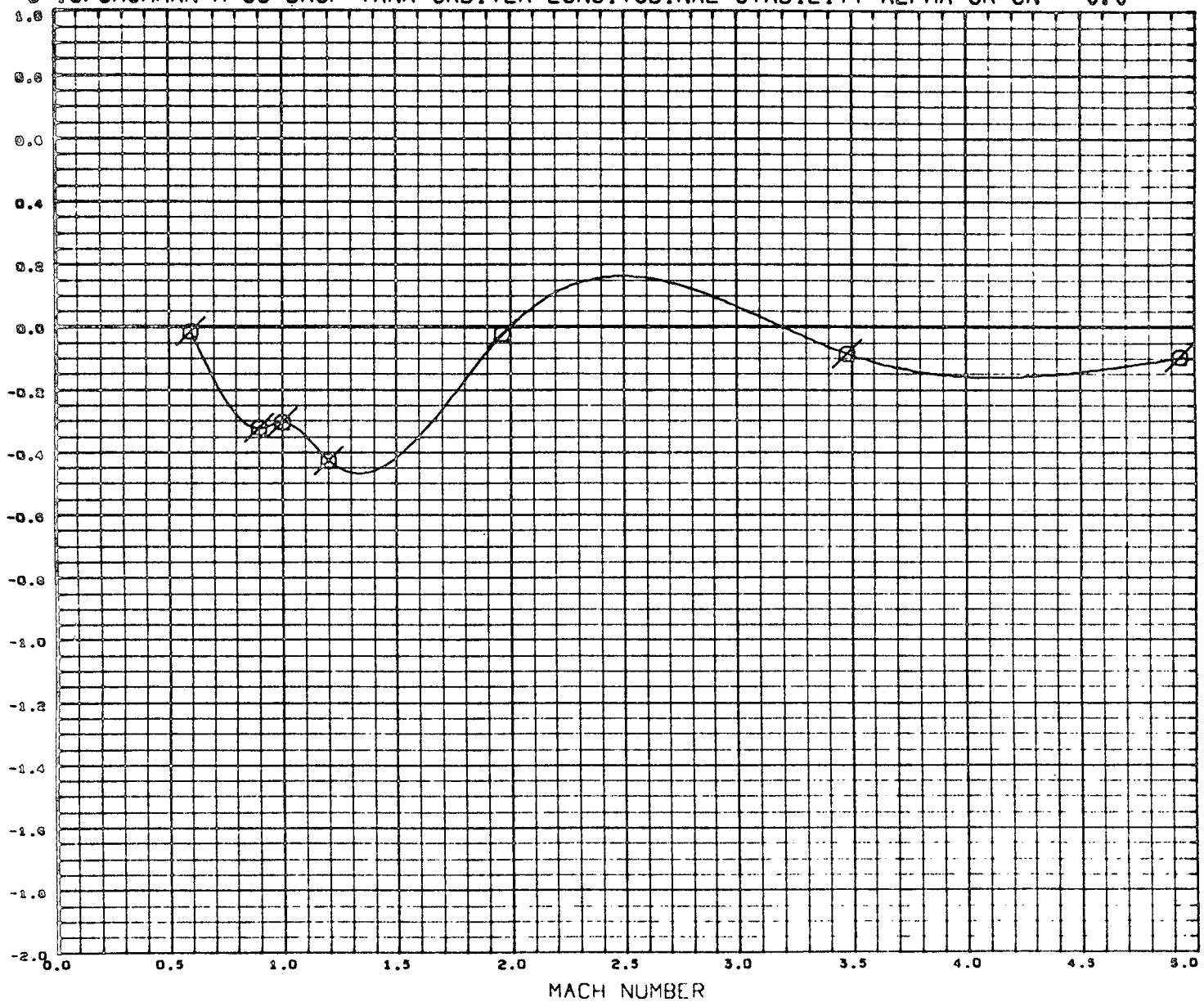
WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

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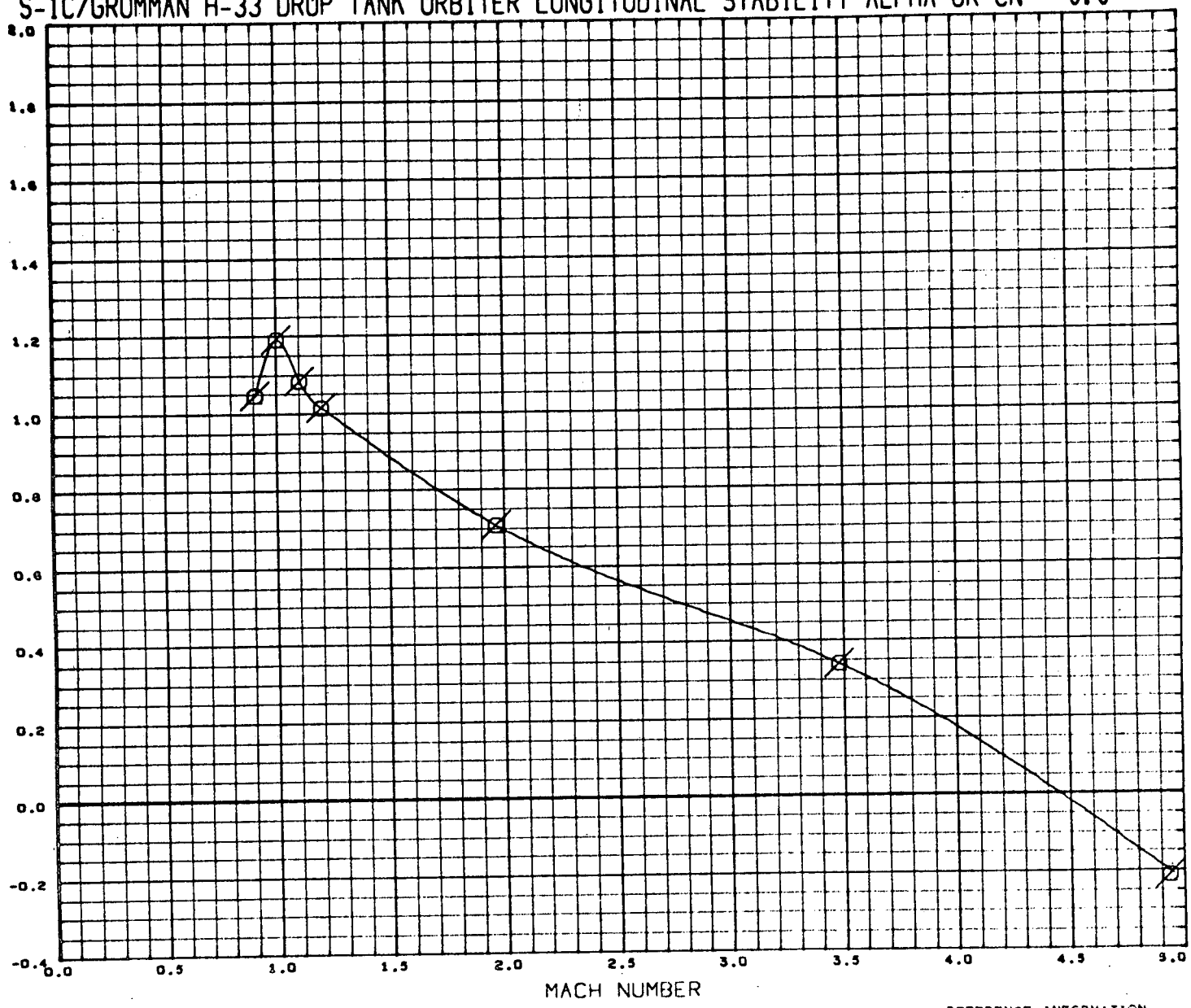

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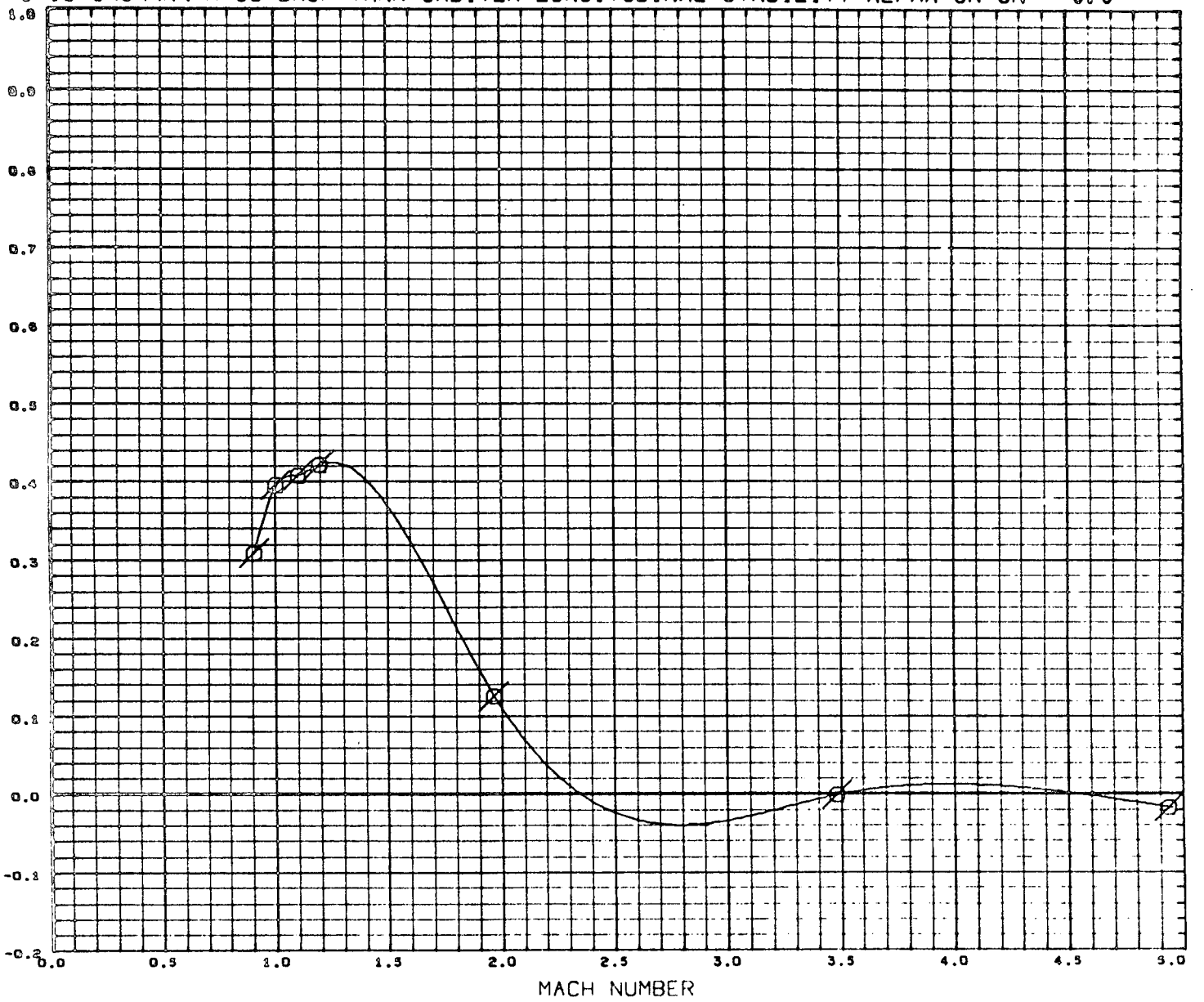

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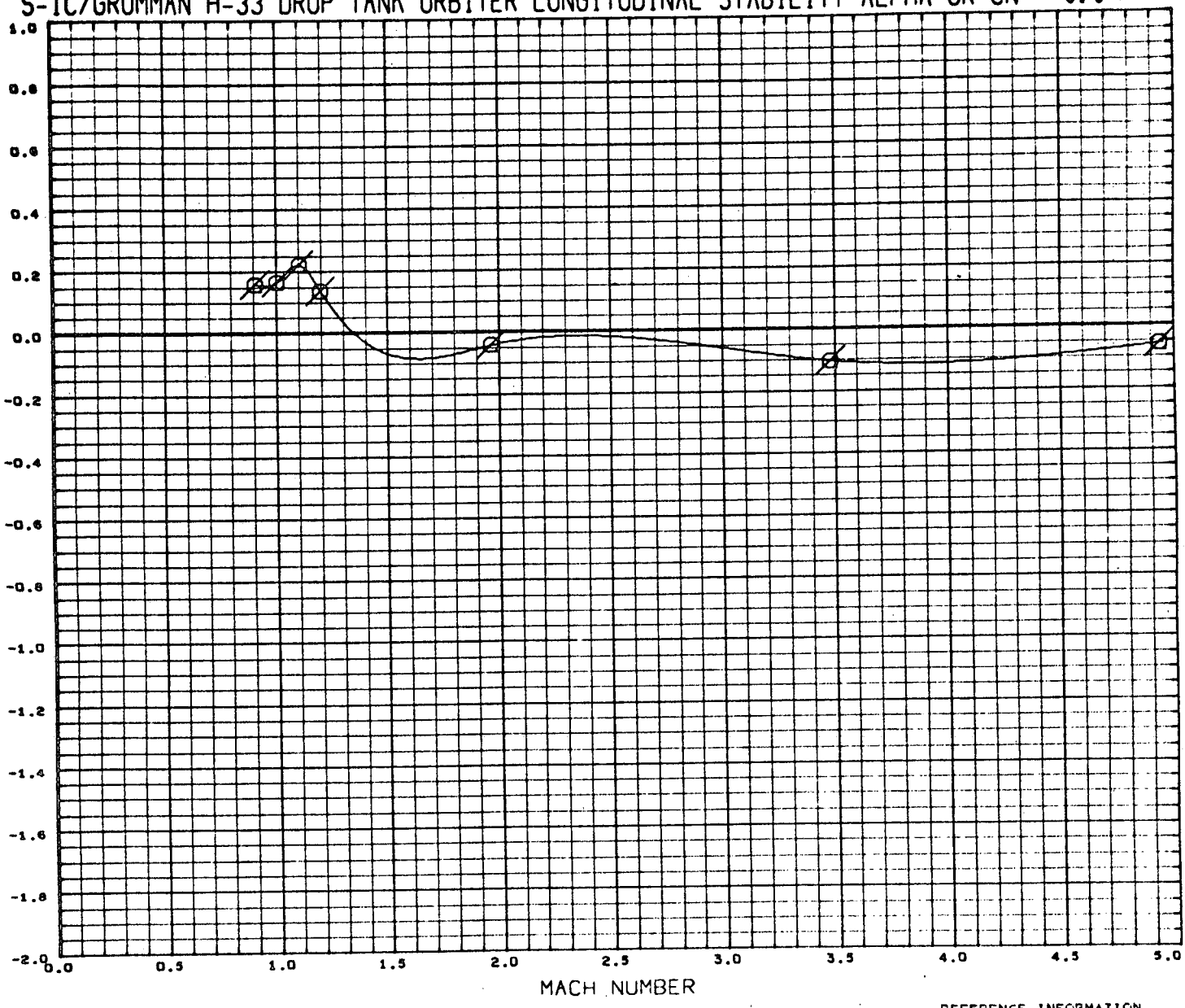

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YMRP	0.0000	IN.
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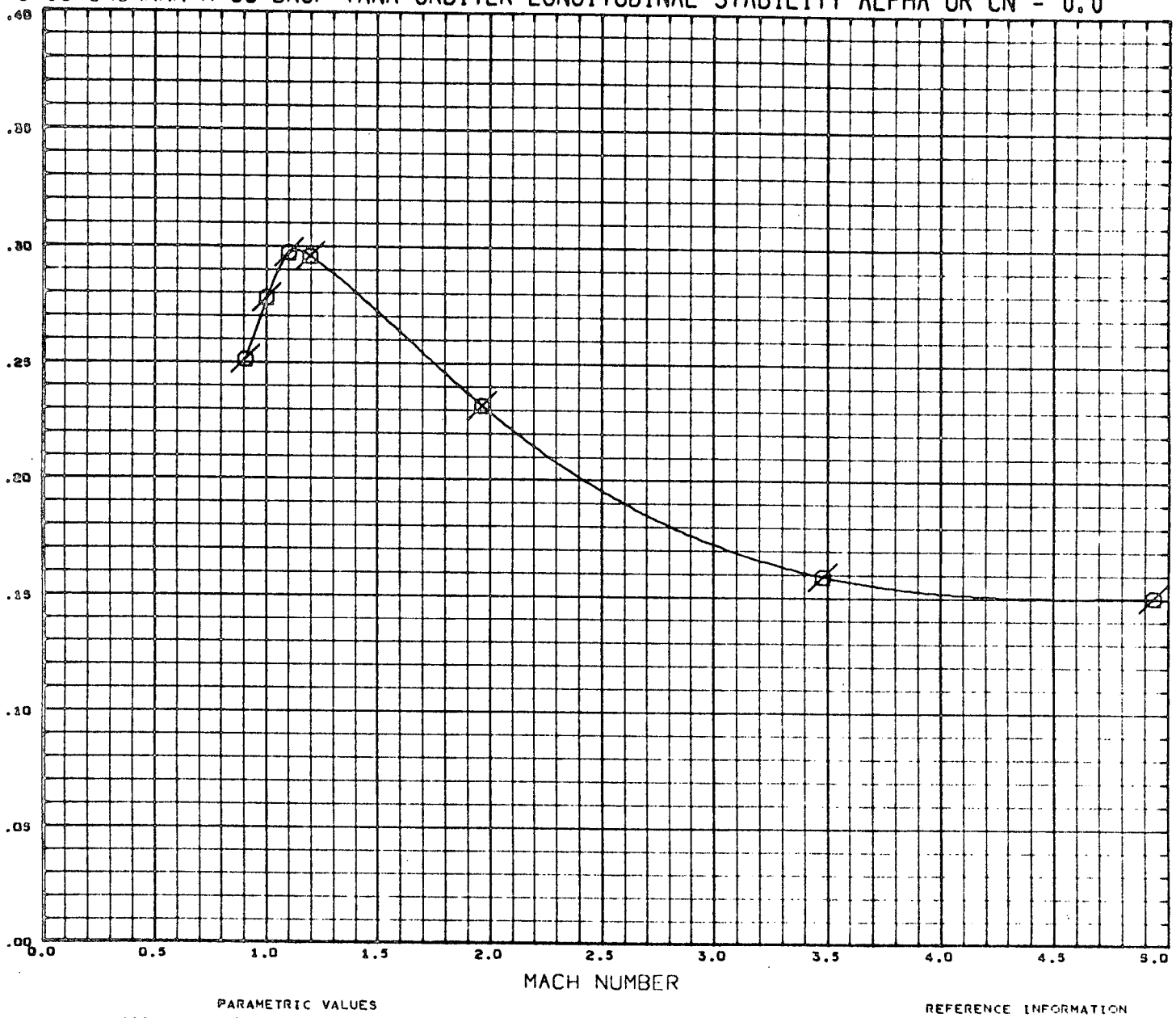

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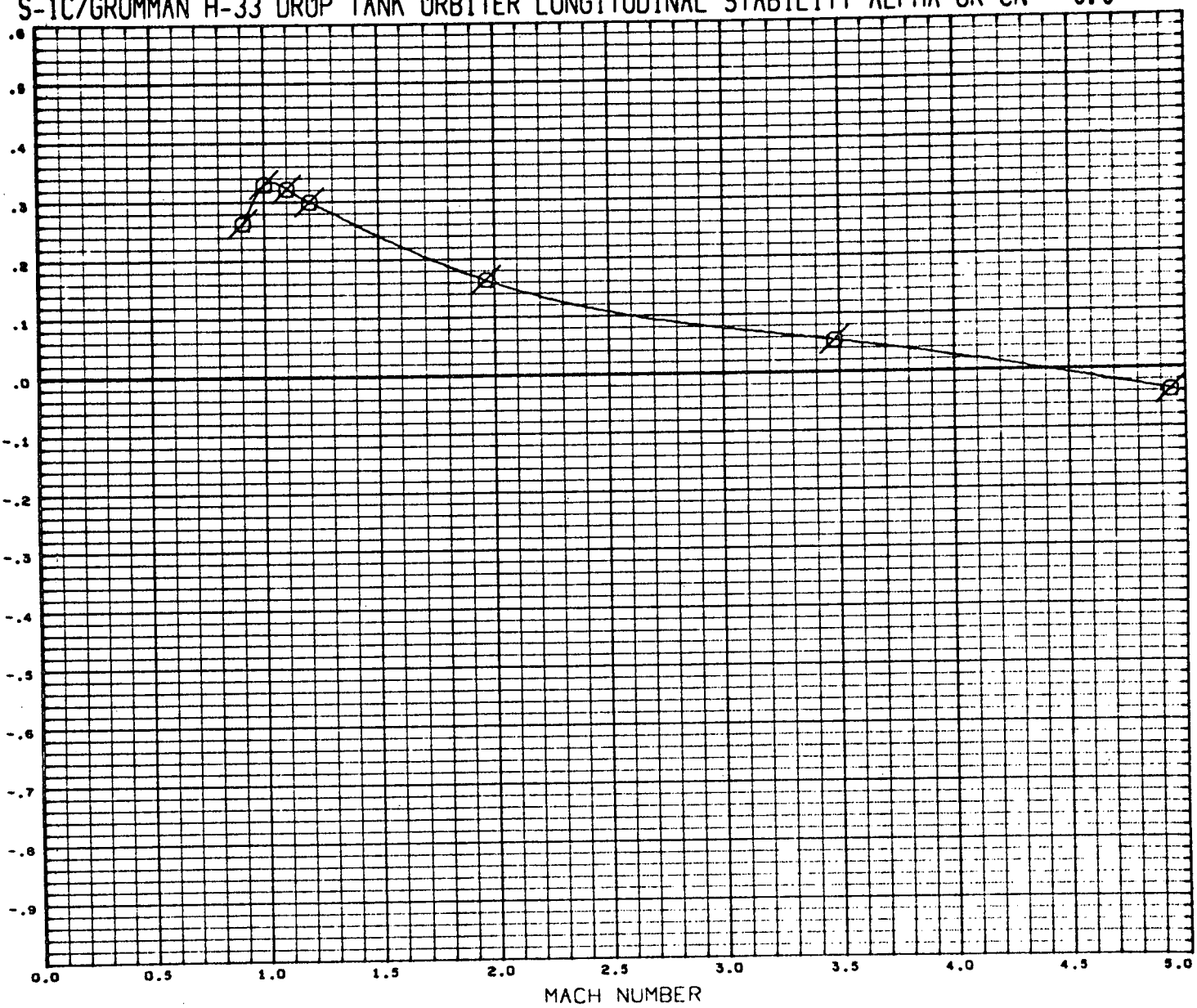

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YMRP	0.0000	IN.
ZMRP	0.0000	IN.
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DATA HIST. CODE CCCGCF

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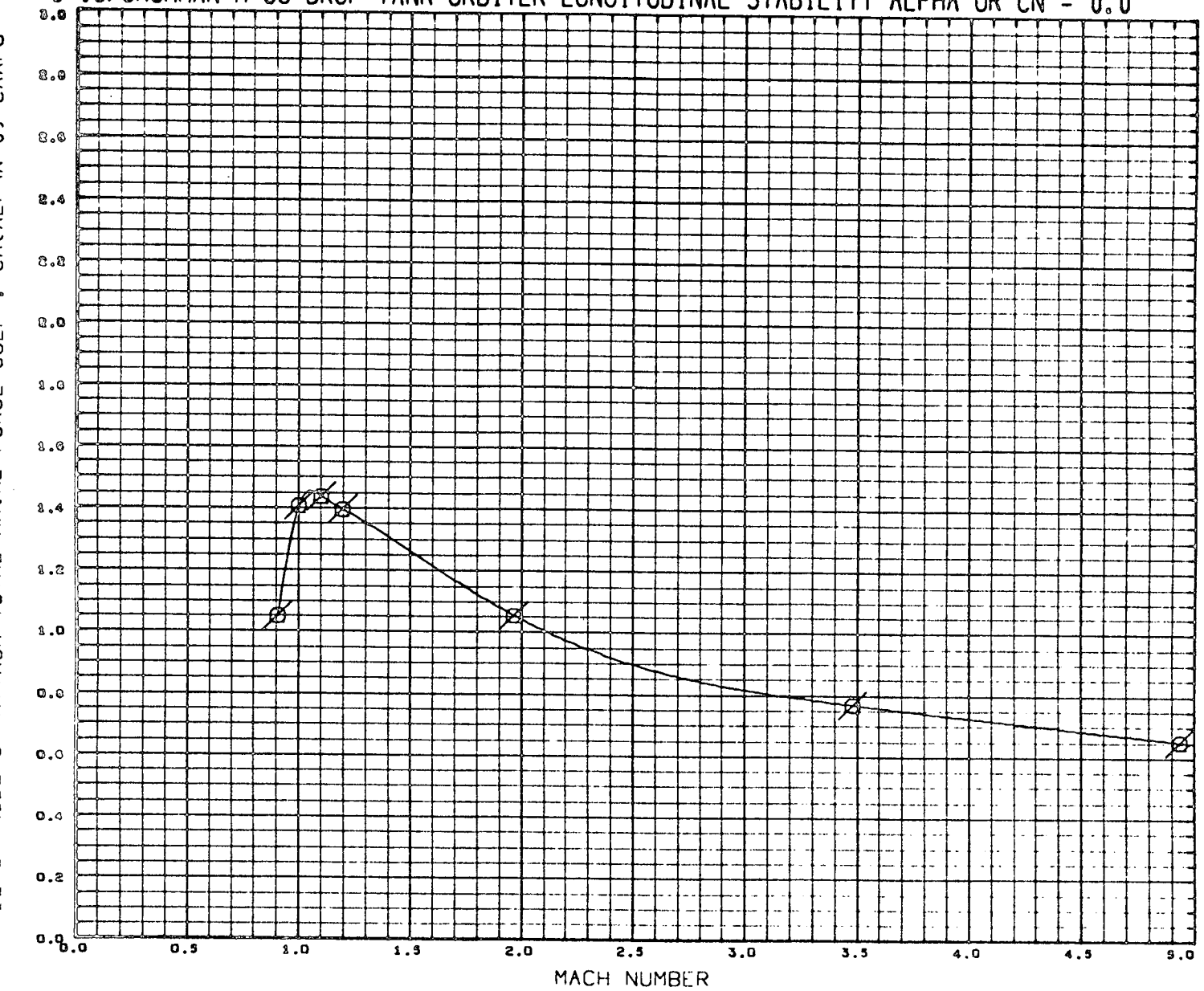

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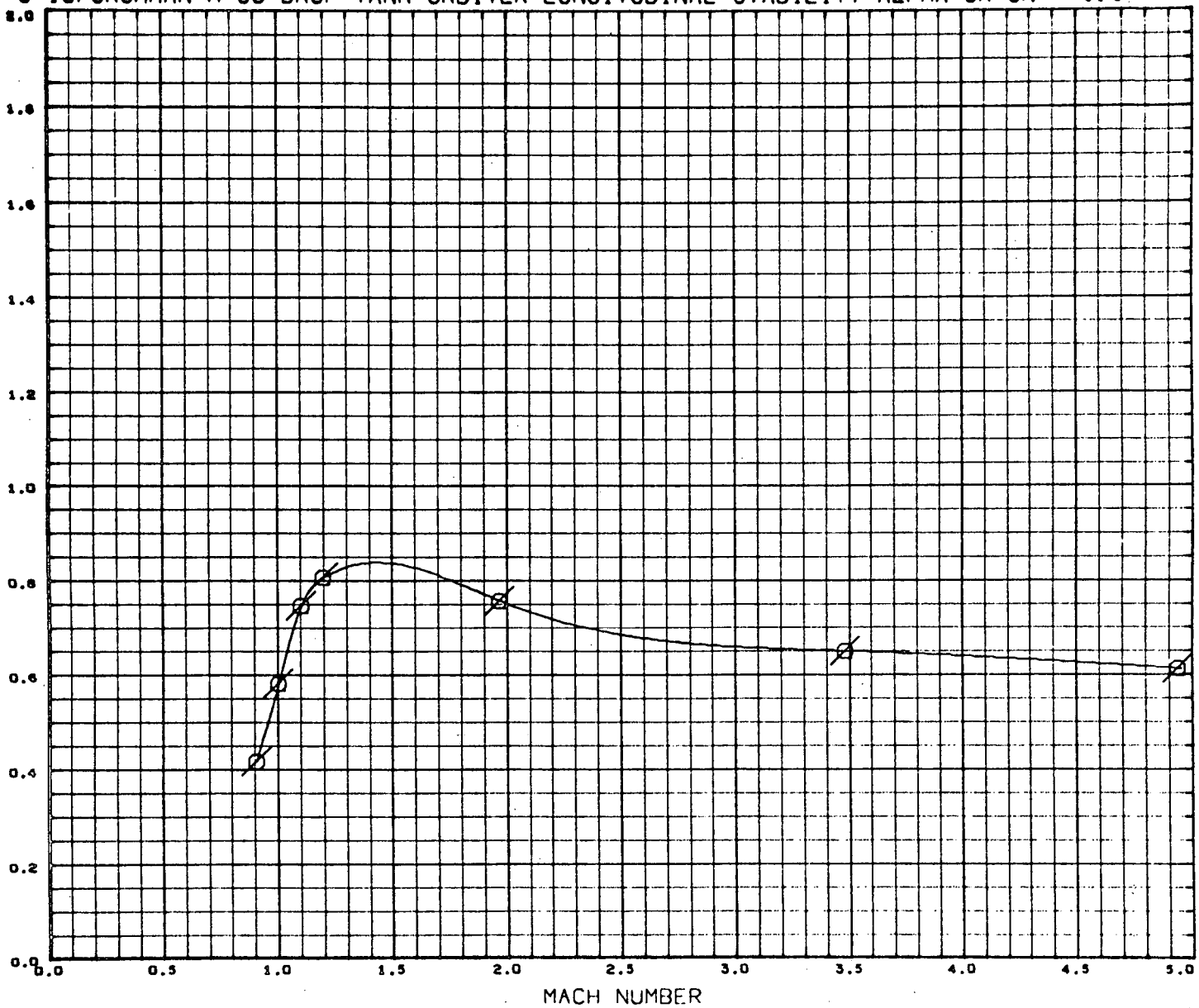

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YMRP	0.0000	IN.
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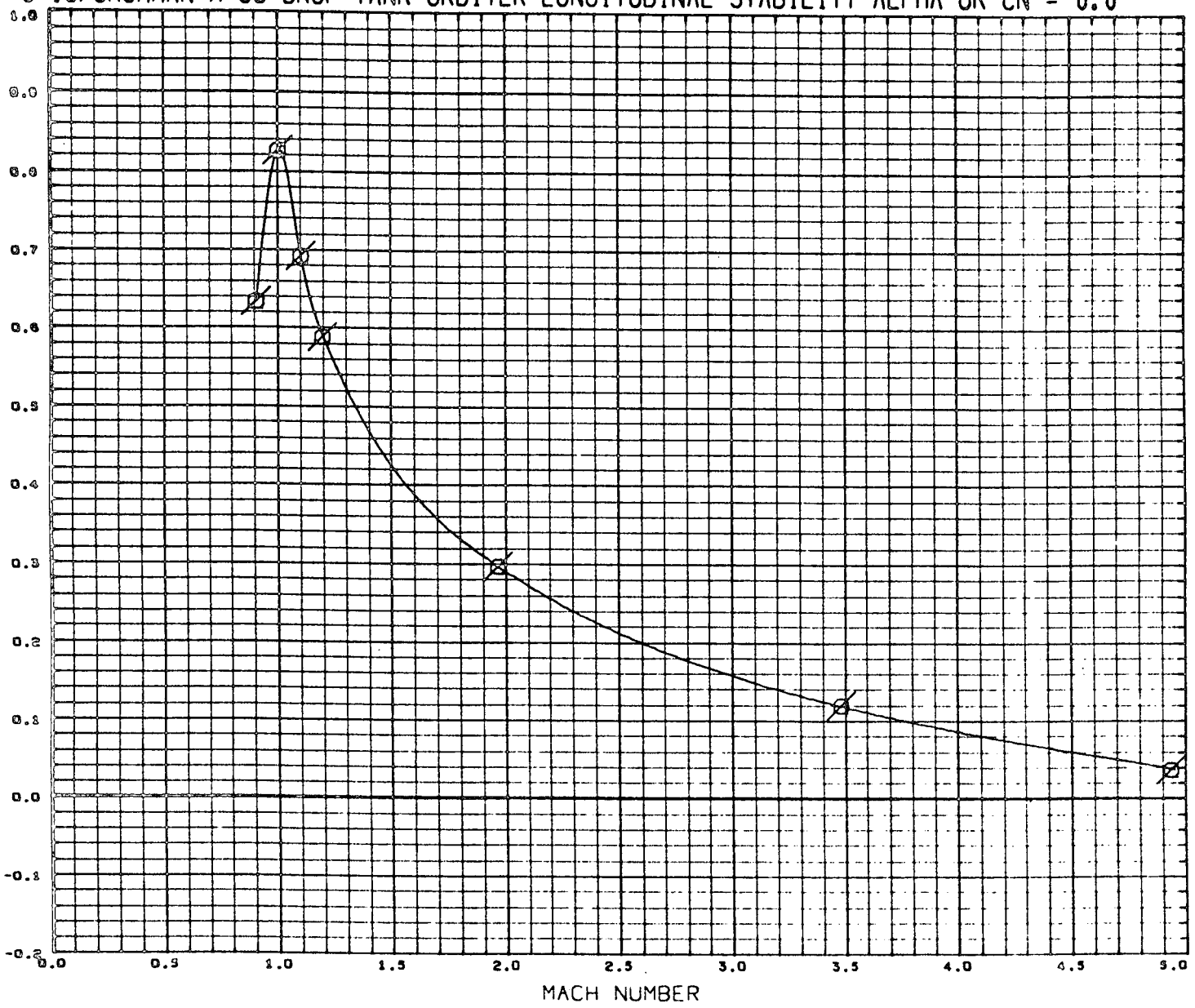

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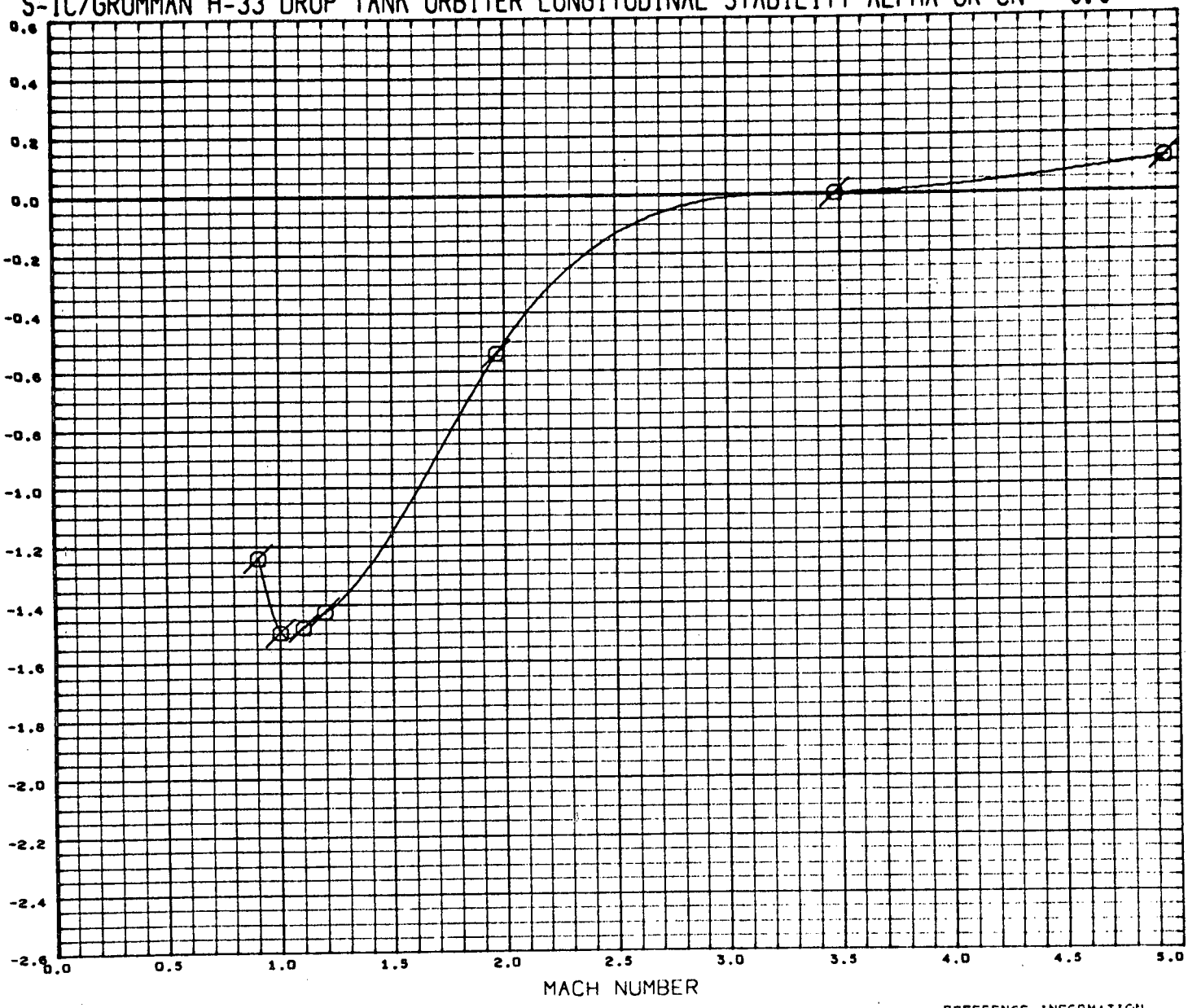

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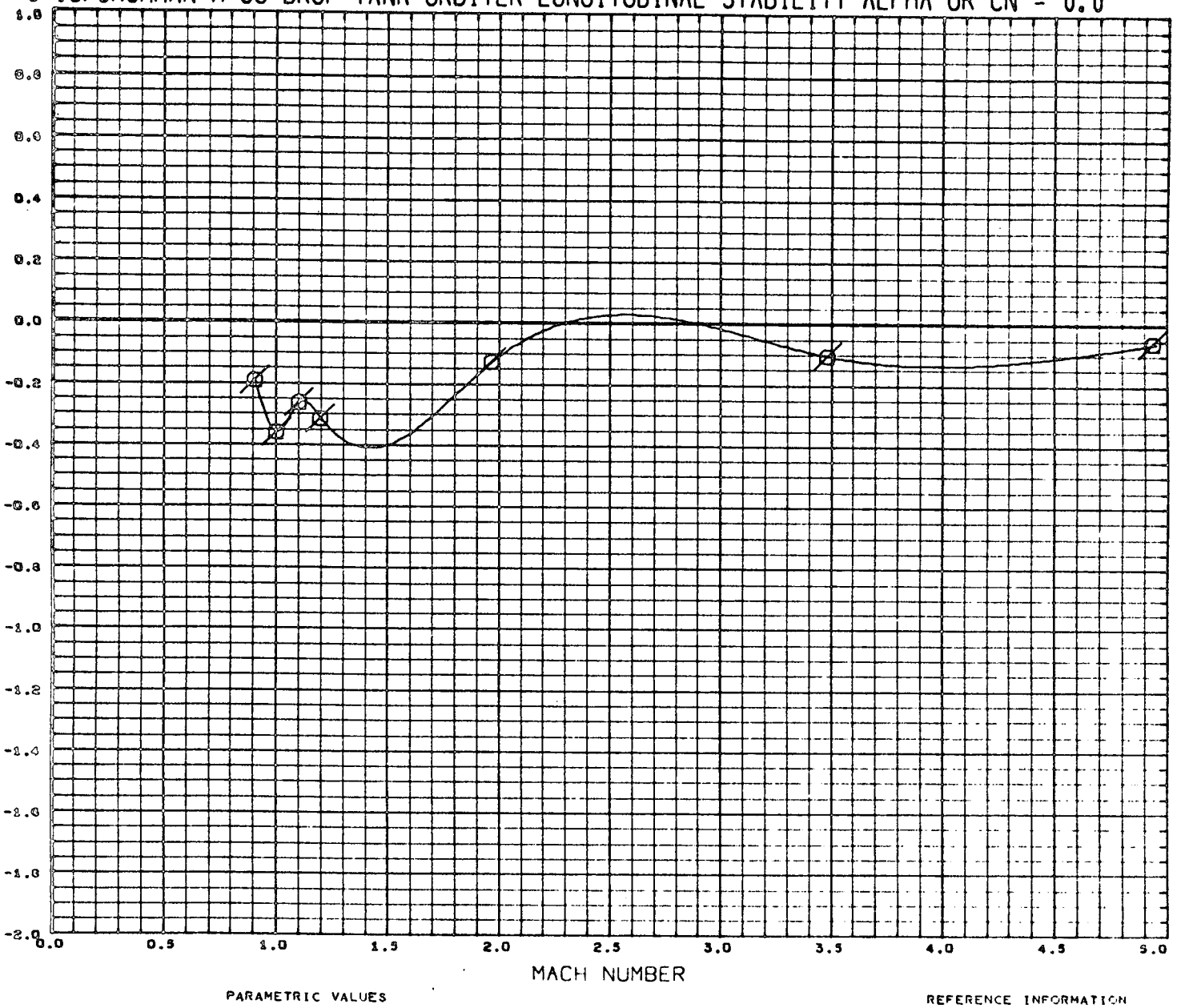

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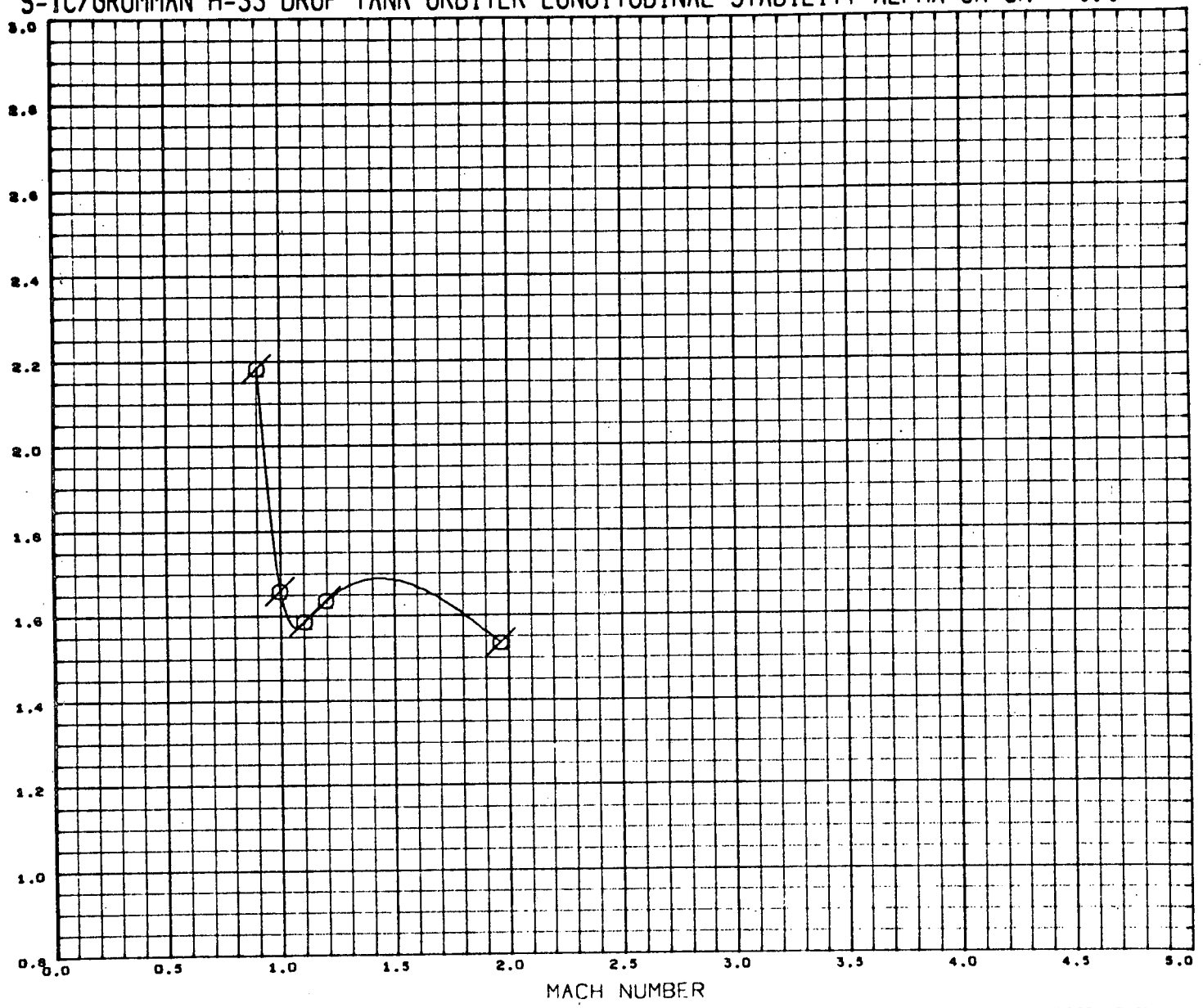

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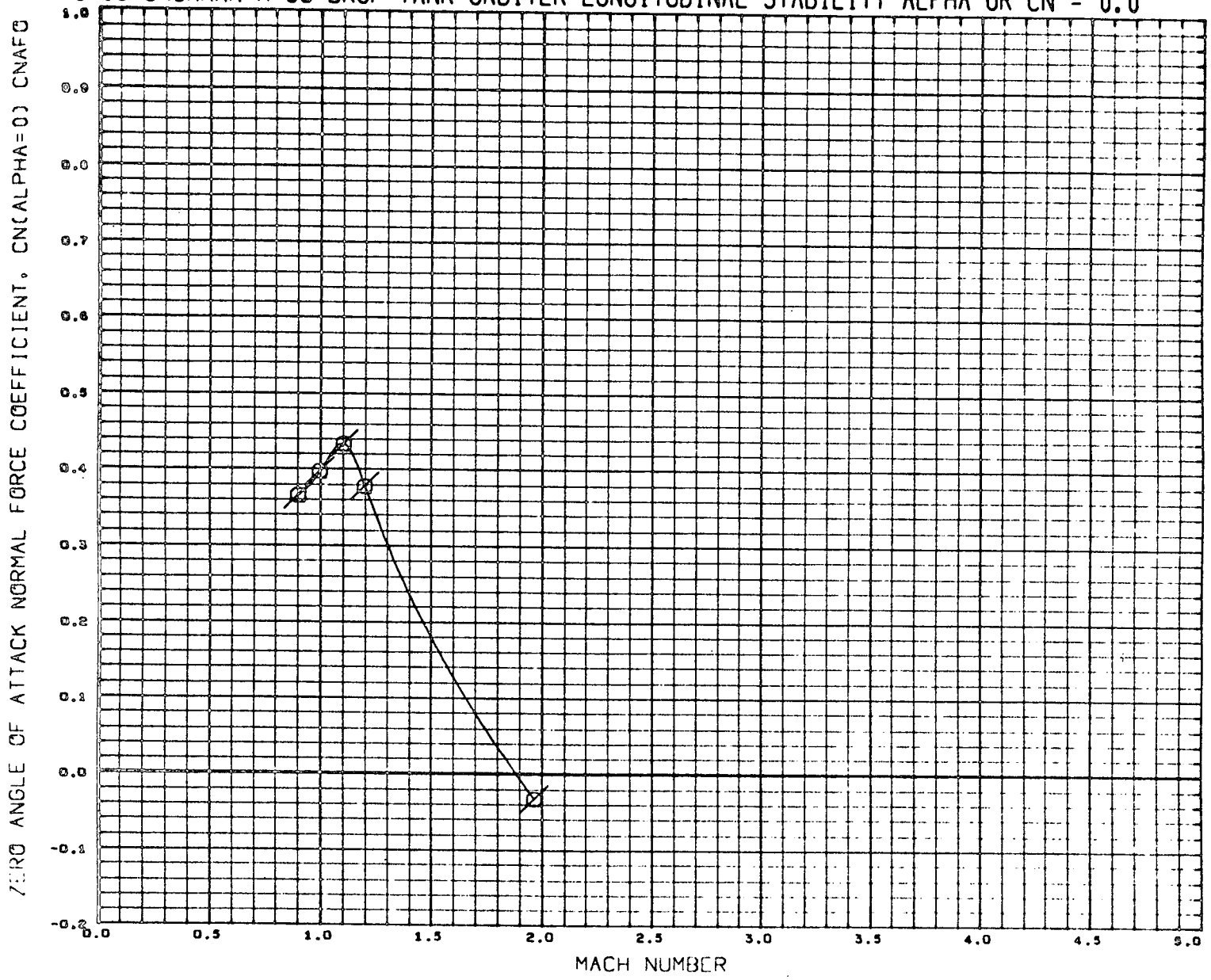

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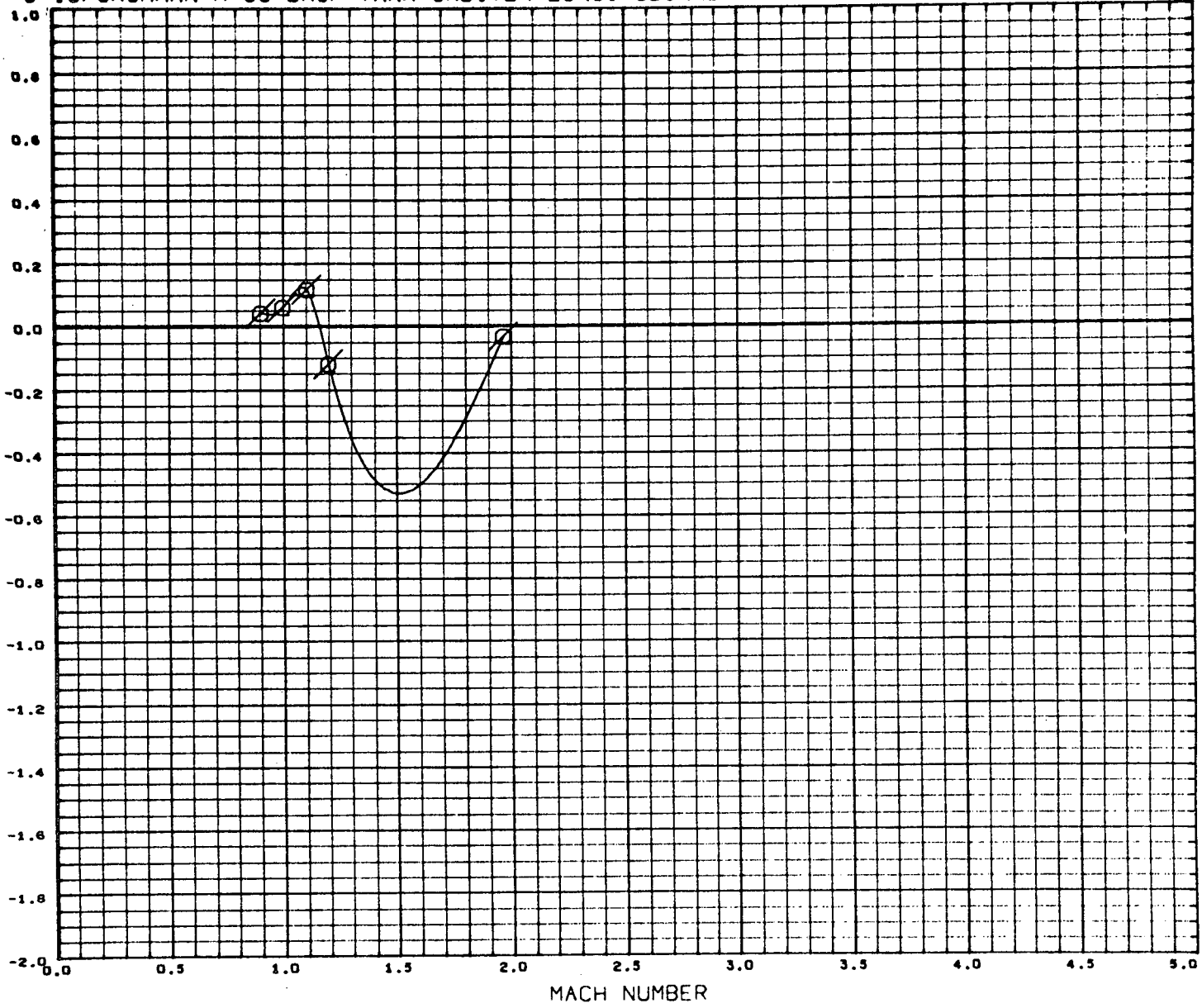

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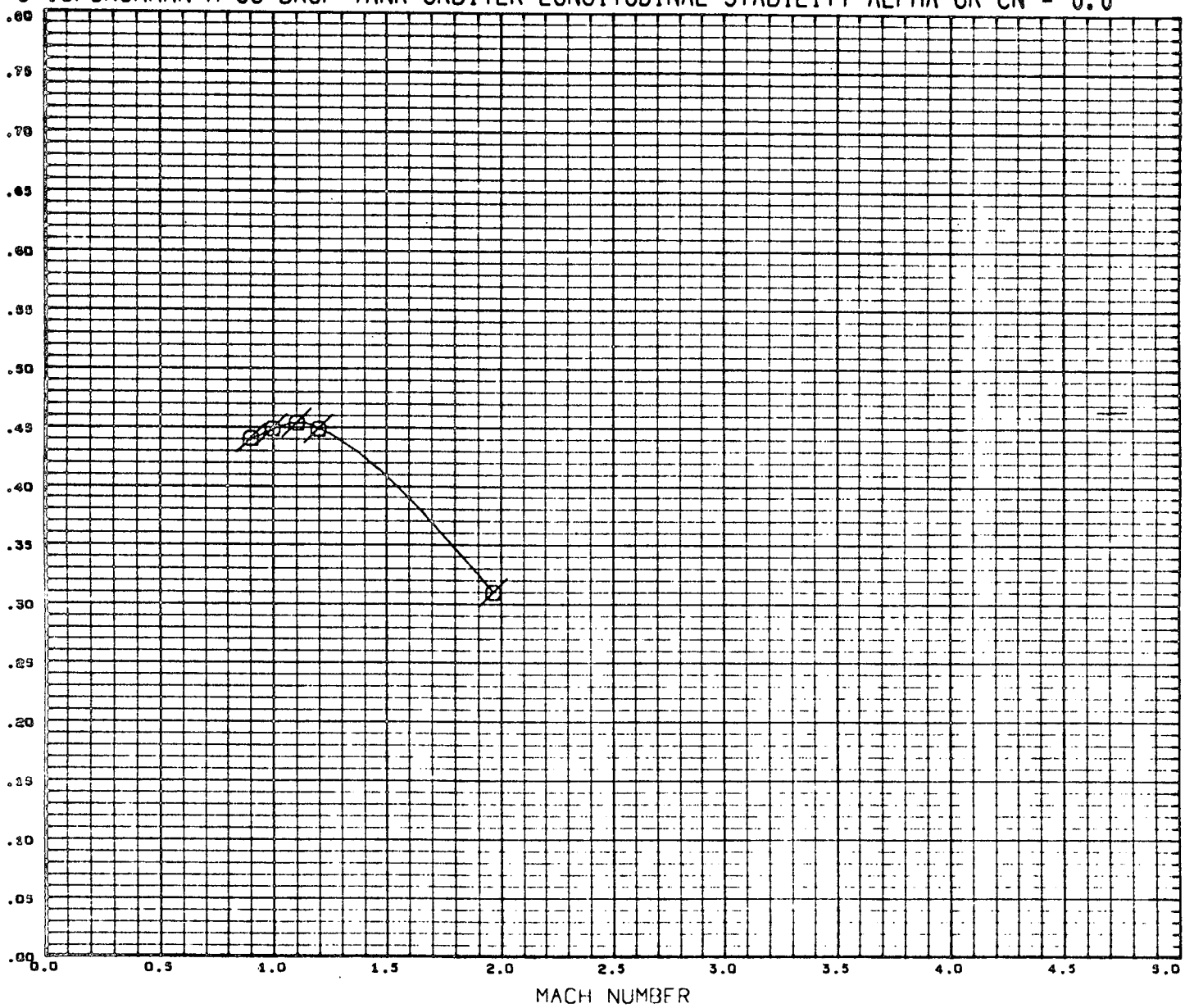

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

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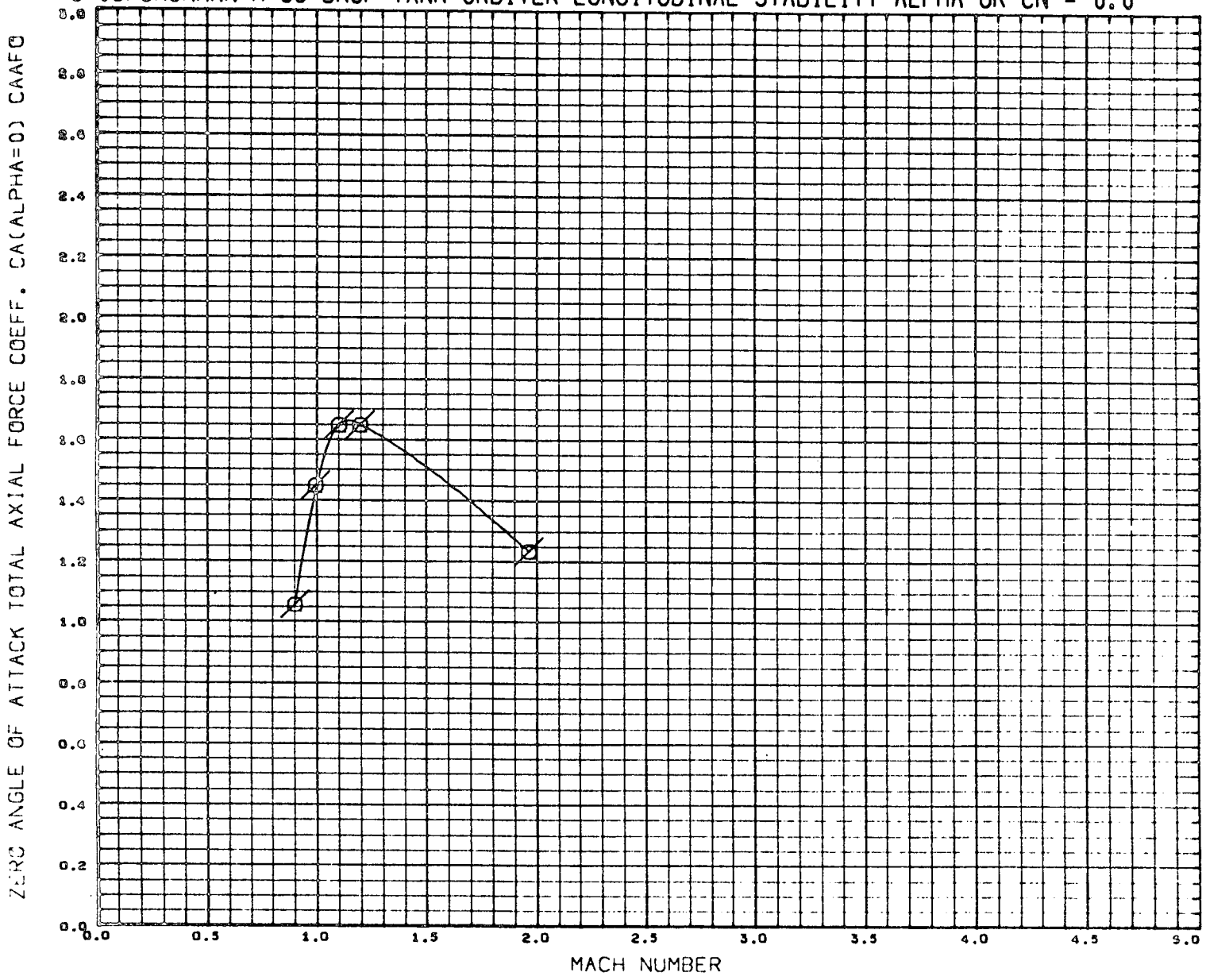

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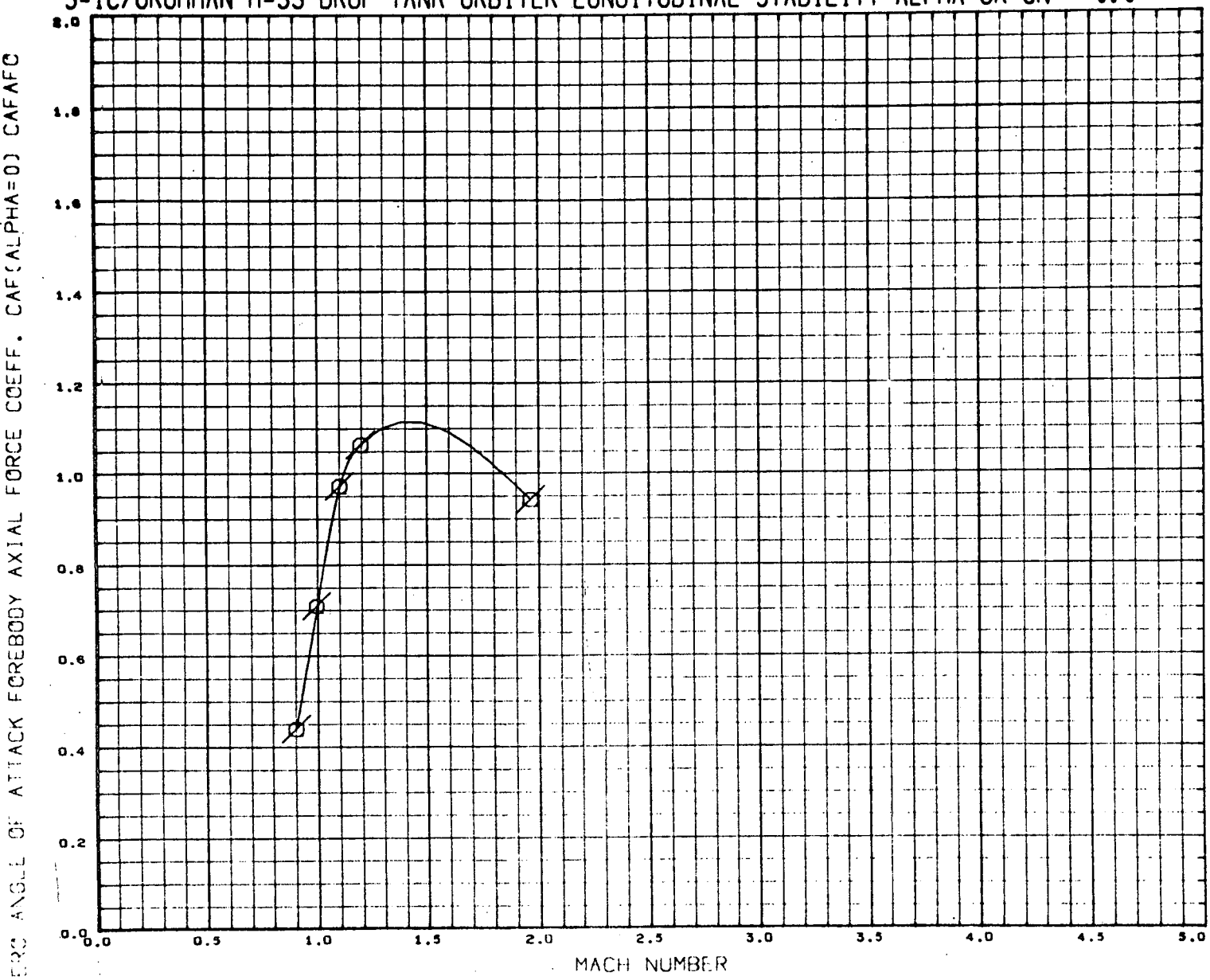

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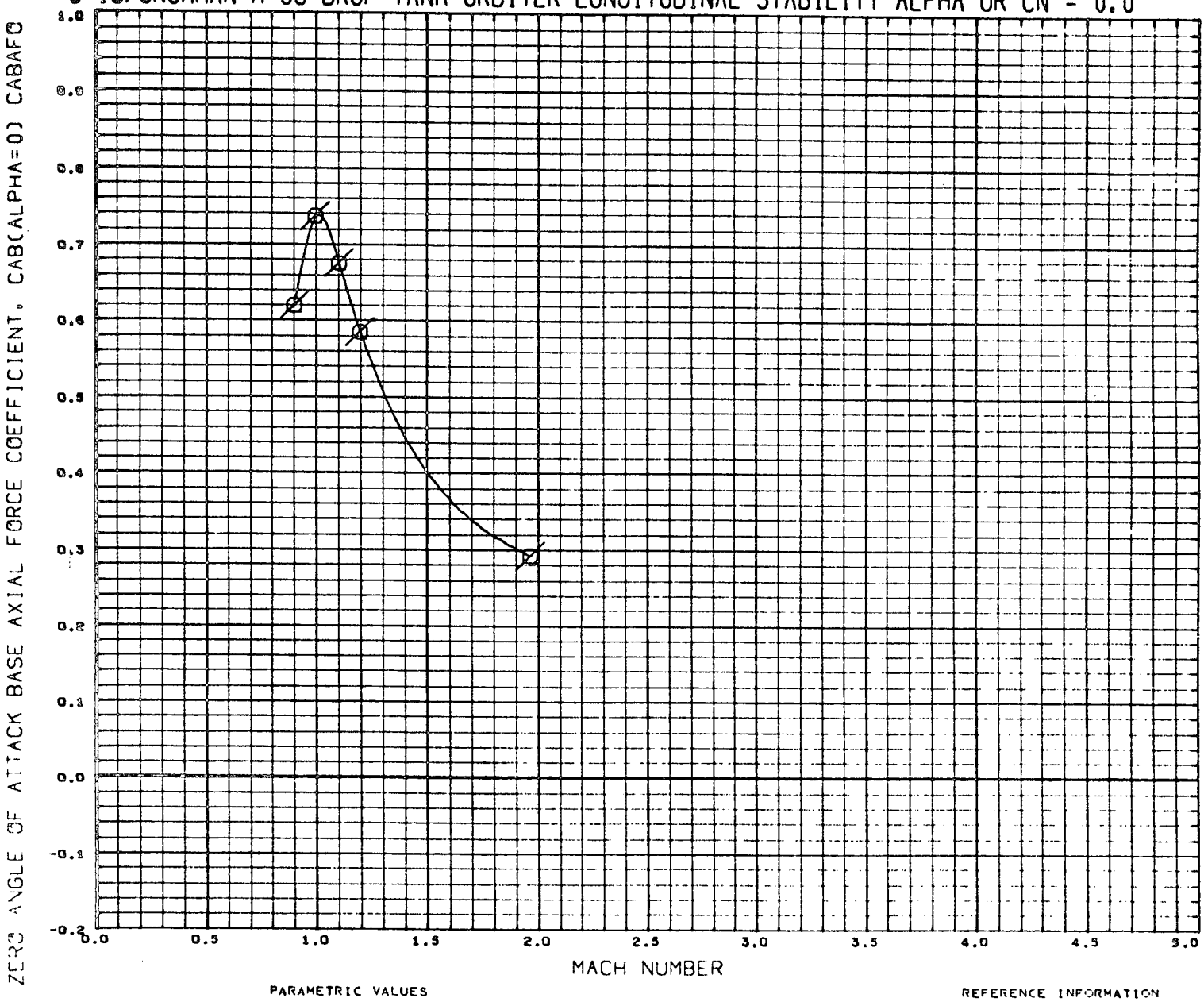

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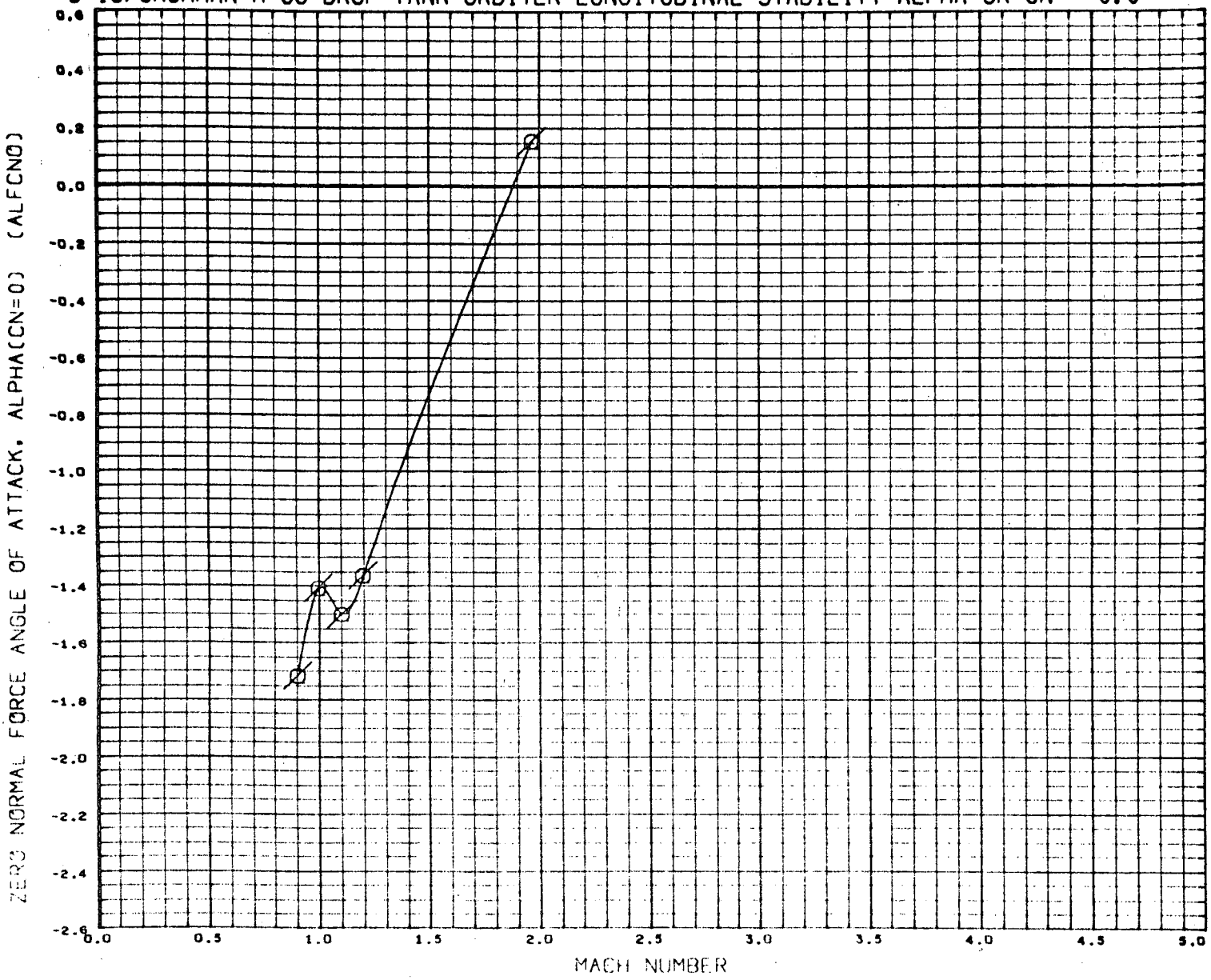

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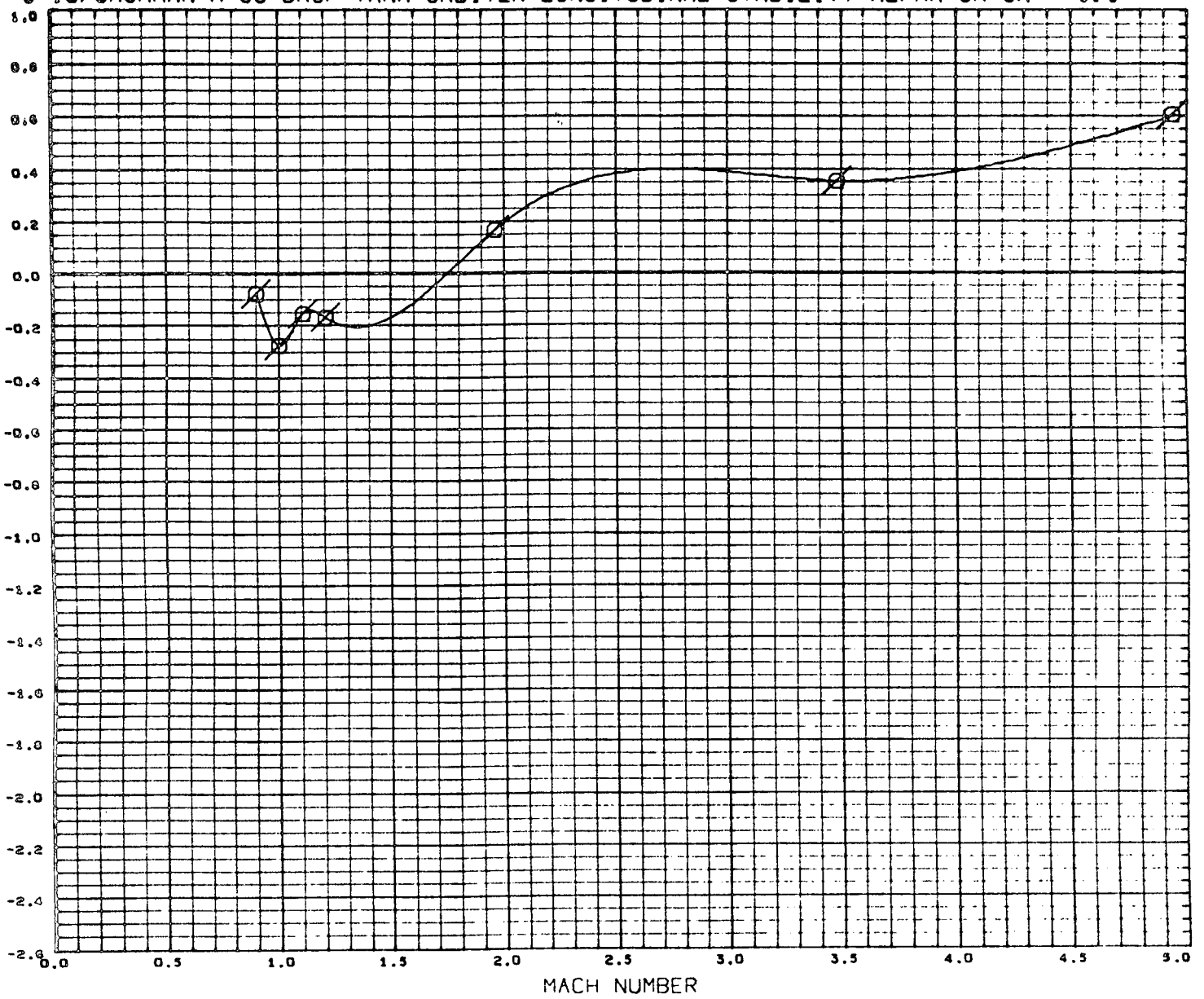

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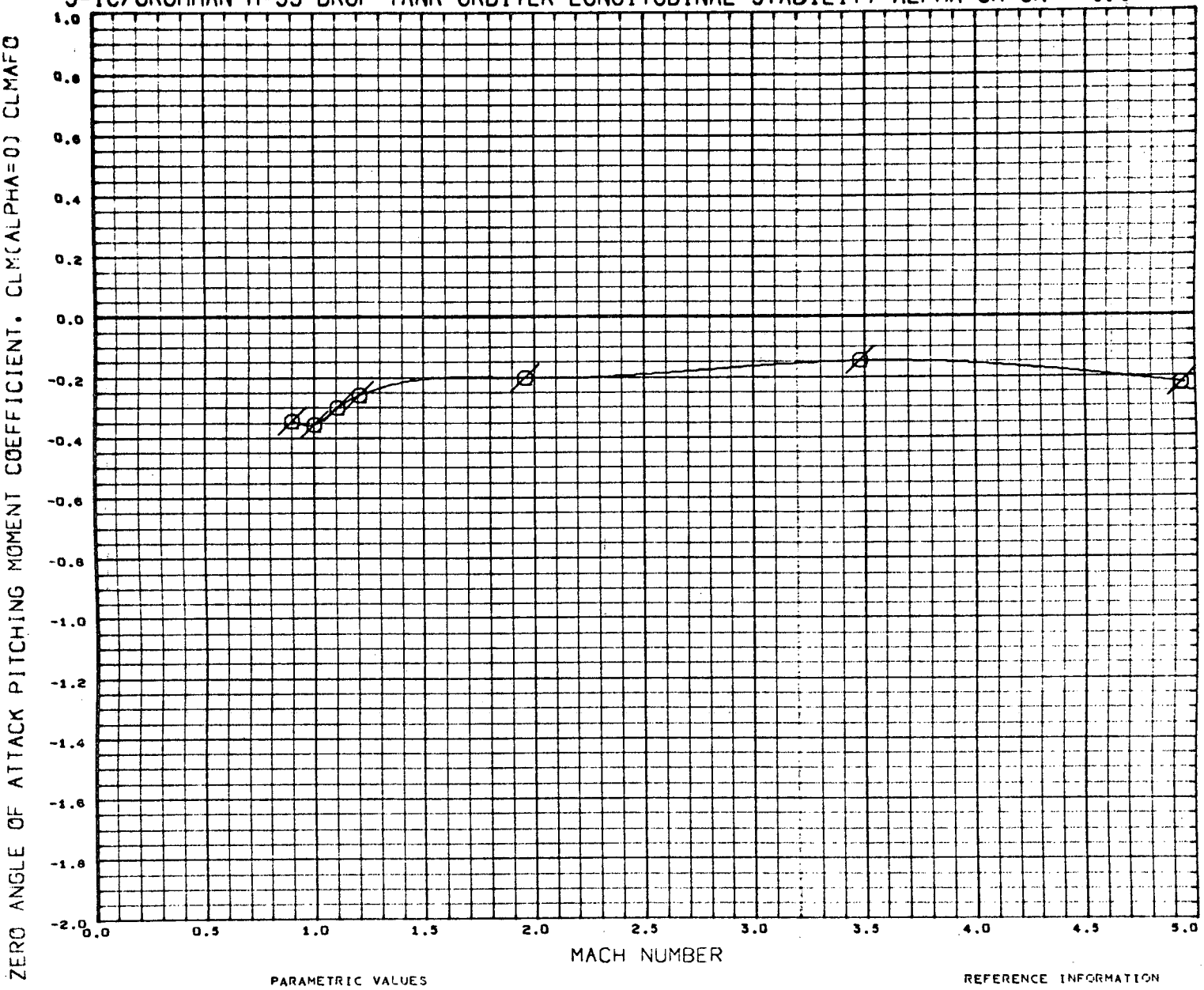

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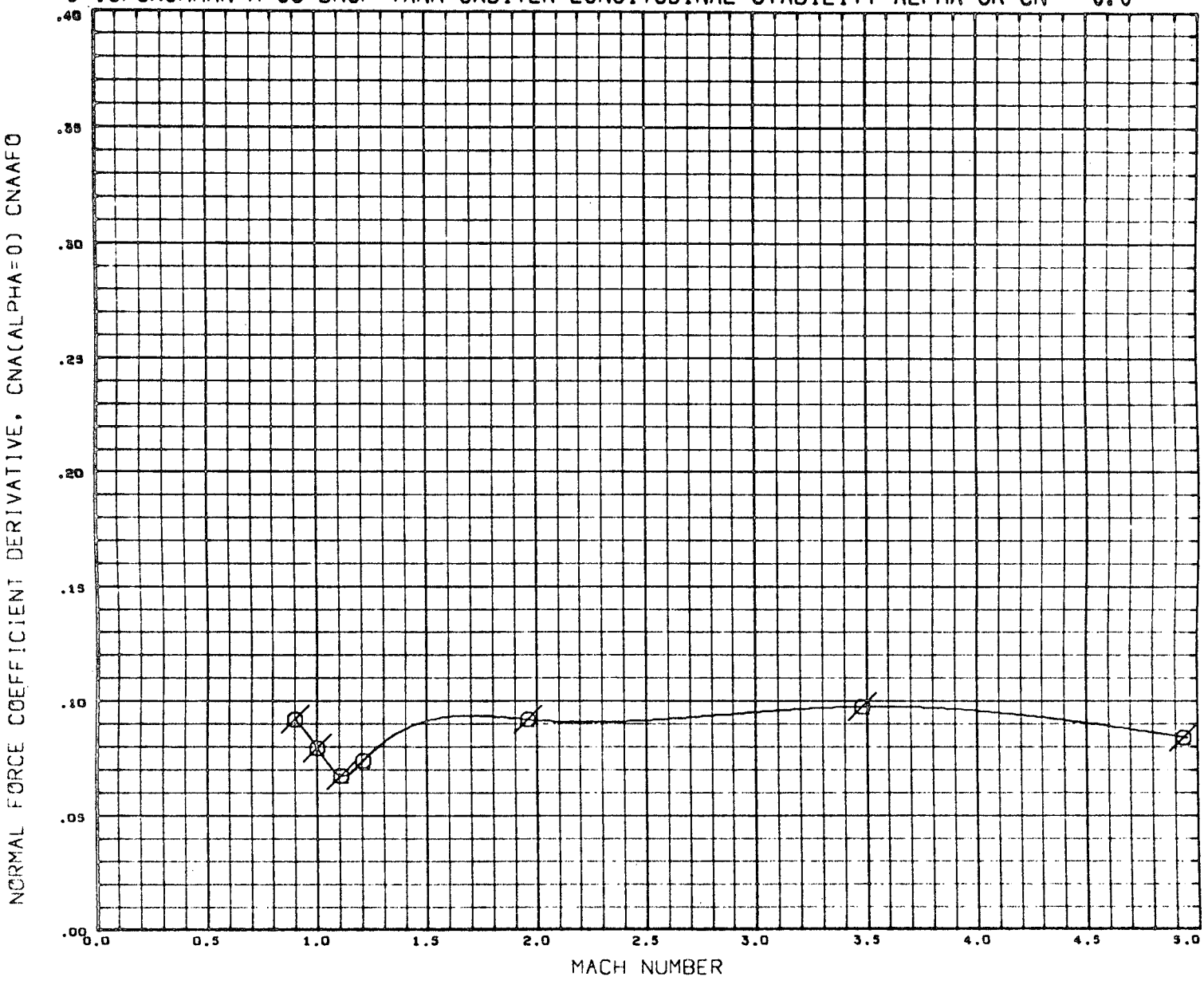

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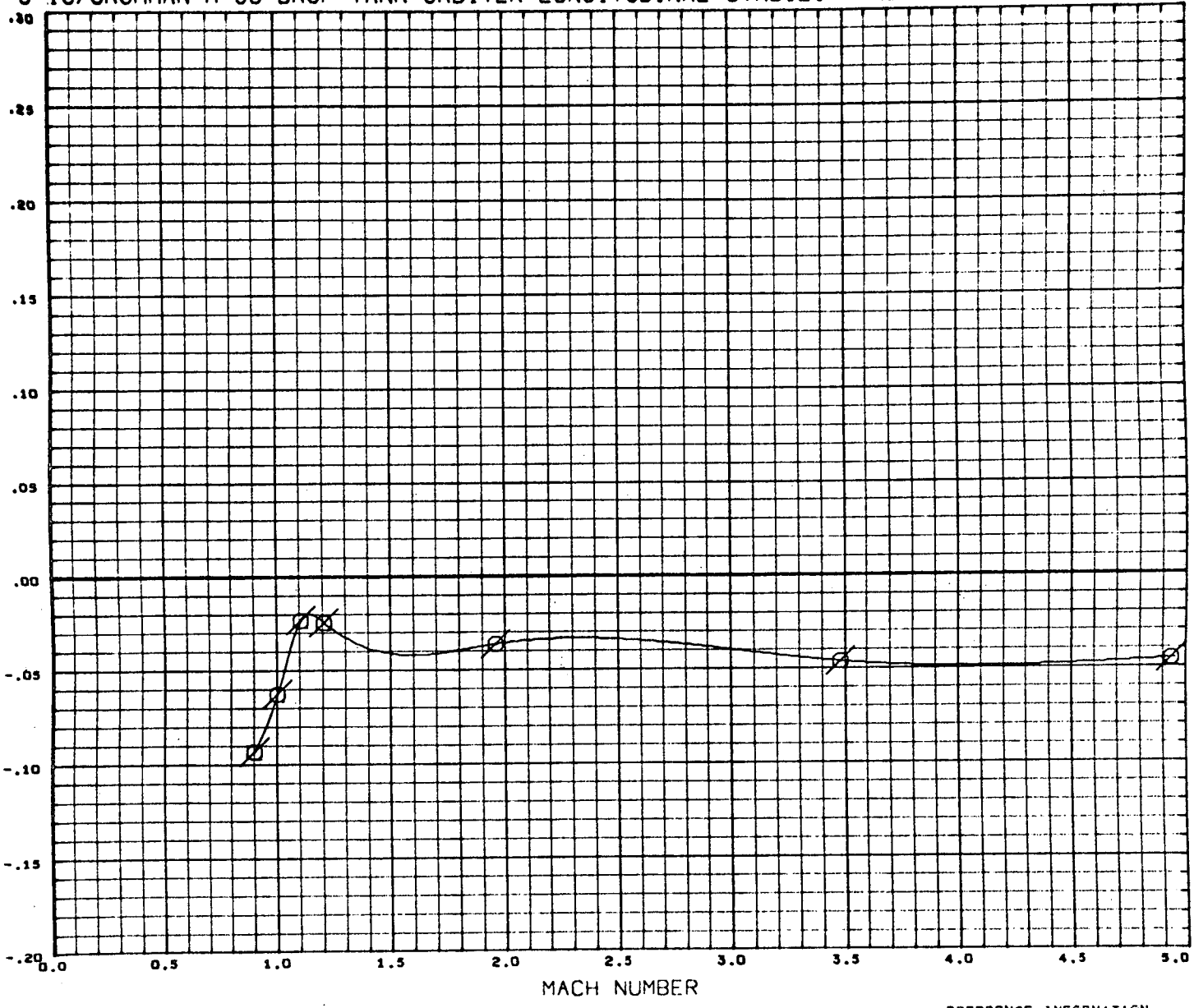

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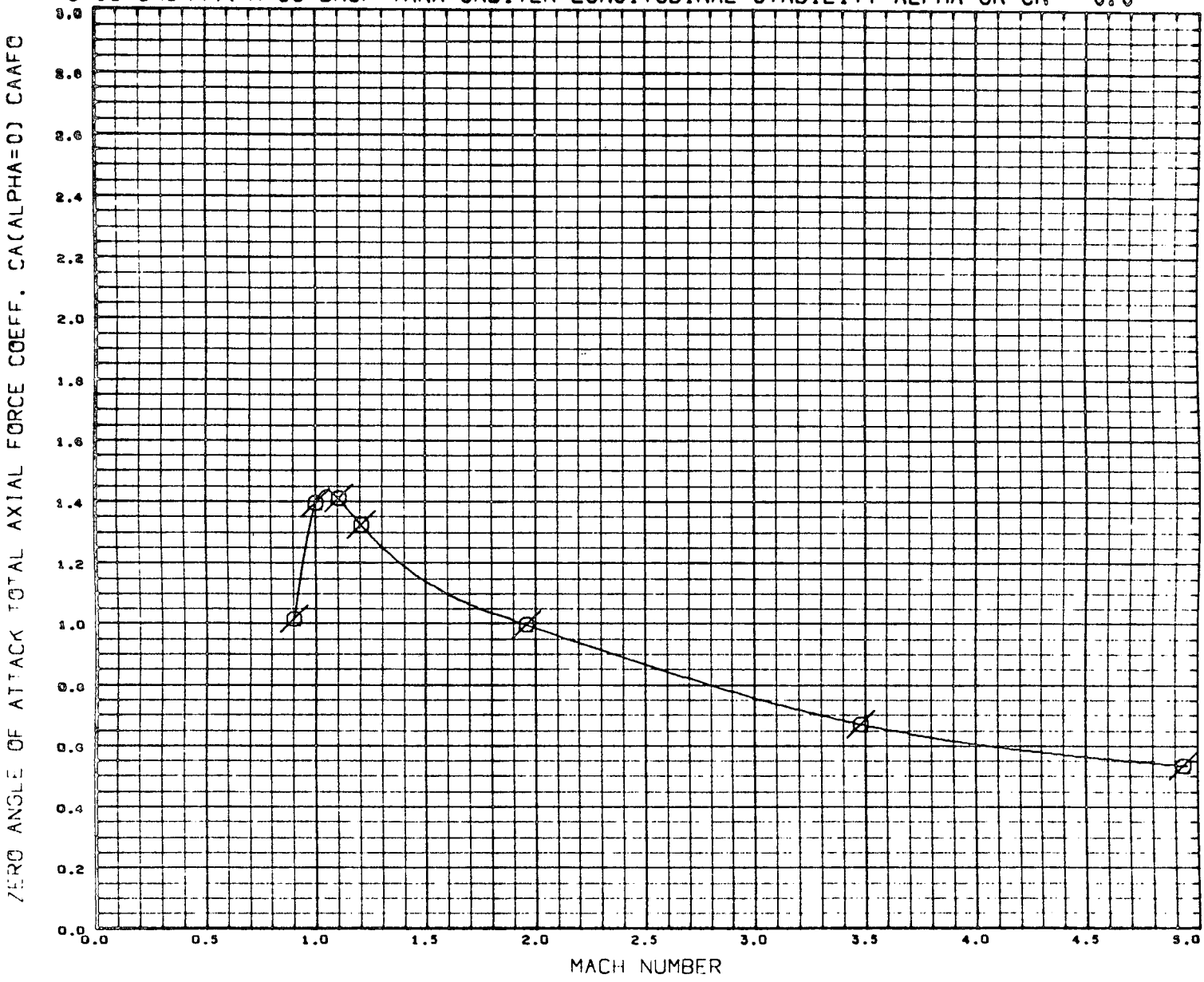

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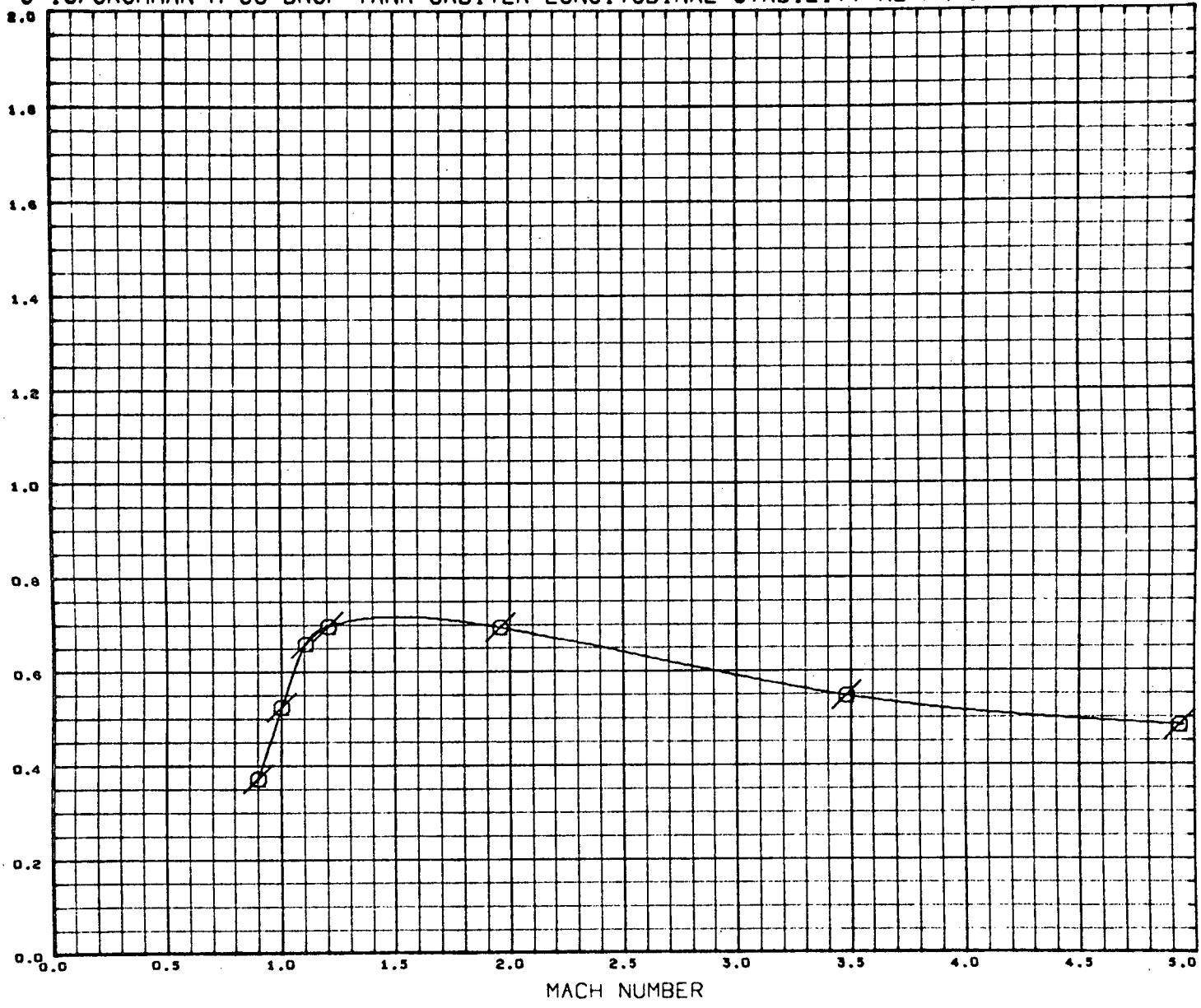
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

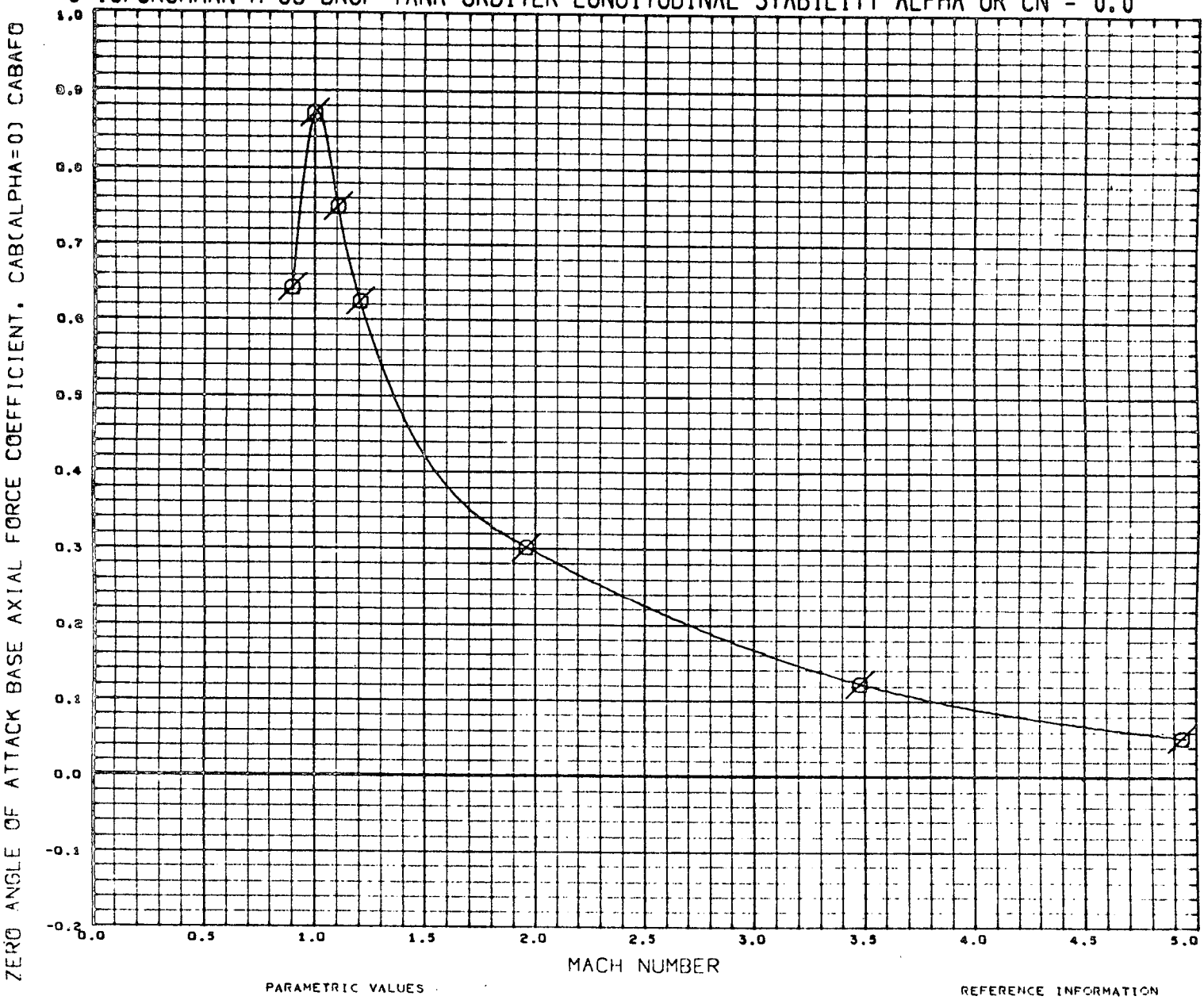
BETA	0.000	PHI	0.000
WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

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WNGIN	0.000		

DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

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LREF	1.3330	IN.
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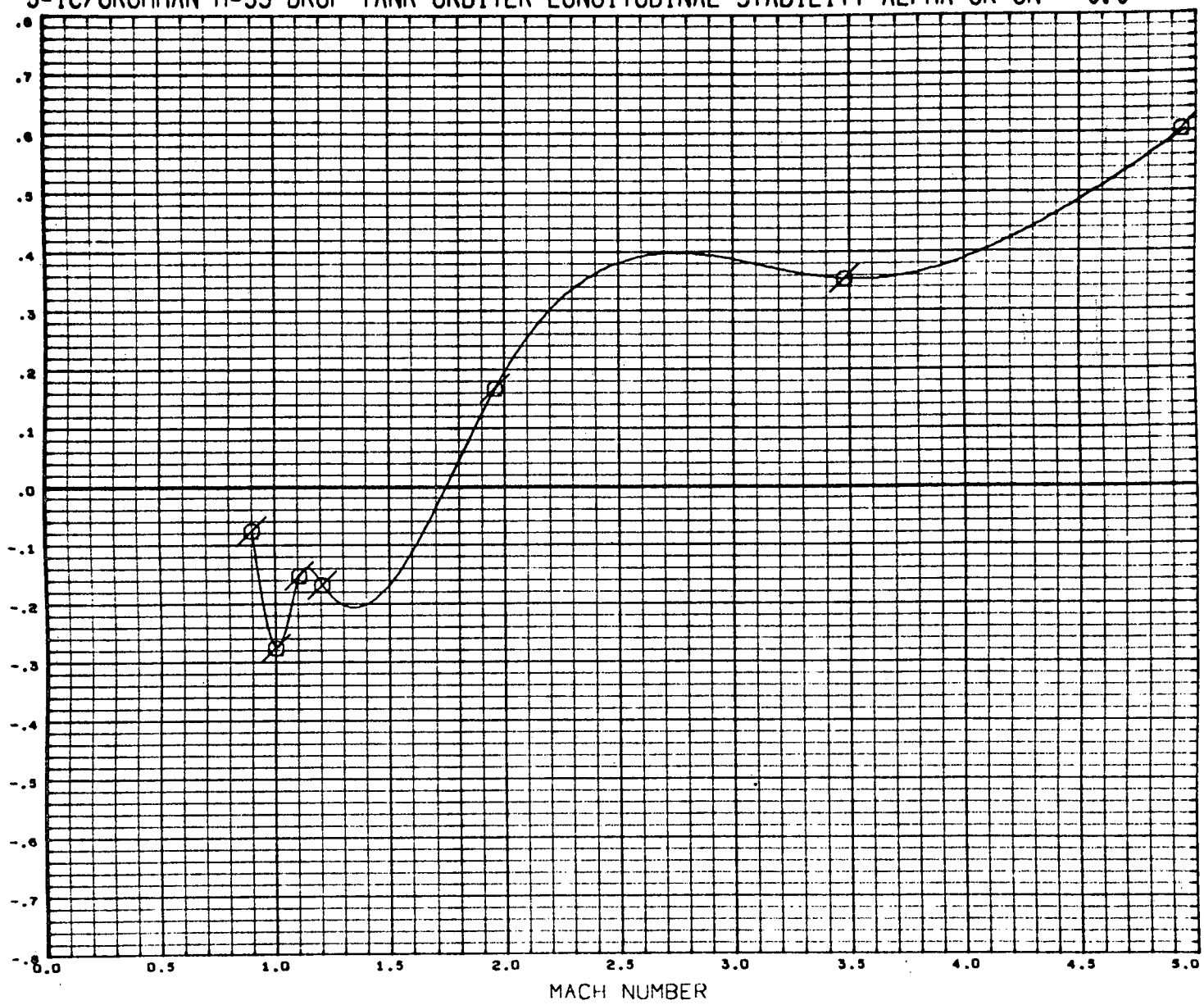
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

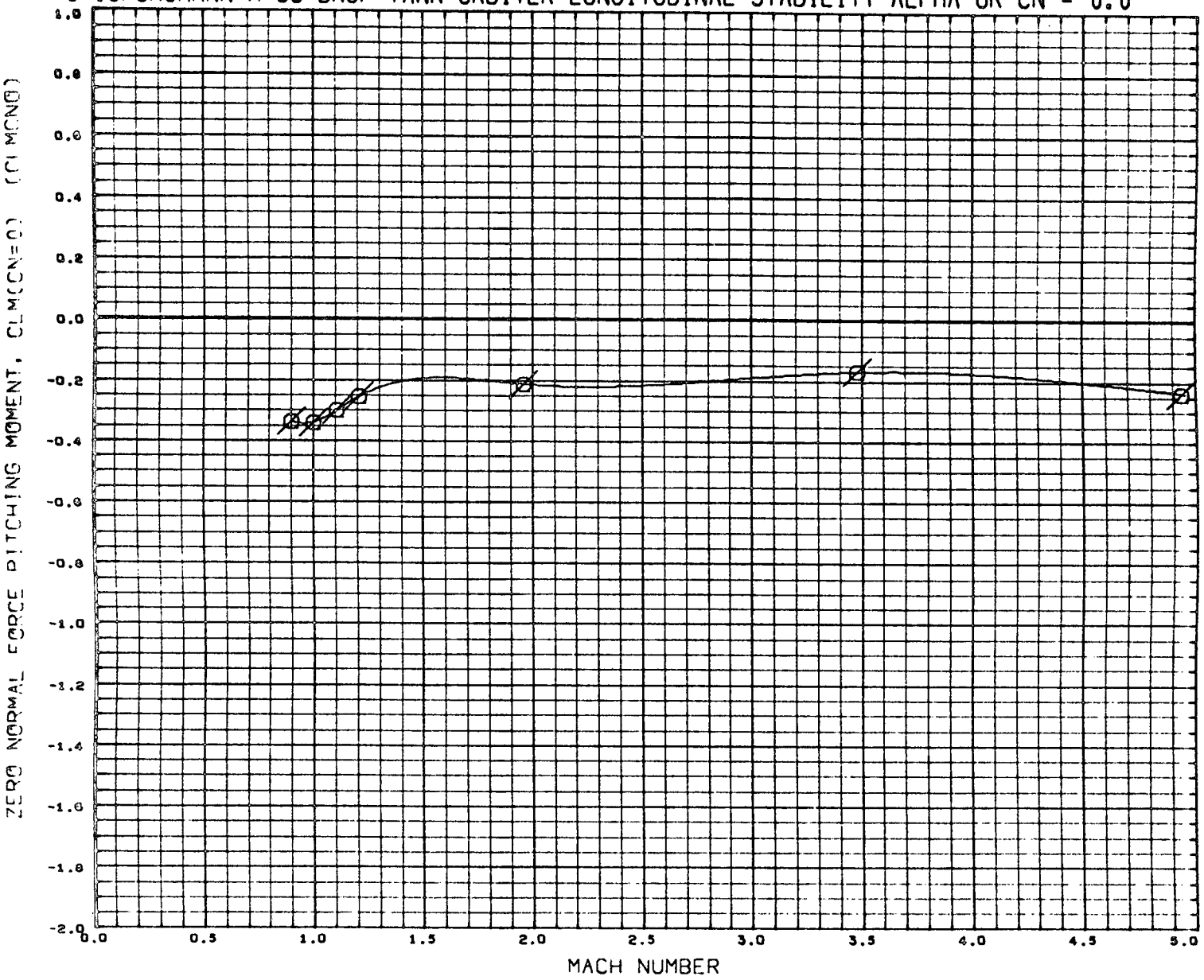
BETA	0.000	PHI	0.000
WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

BETA	0.000	PHI	0.000
WNGIN	0.000		

DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

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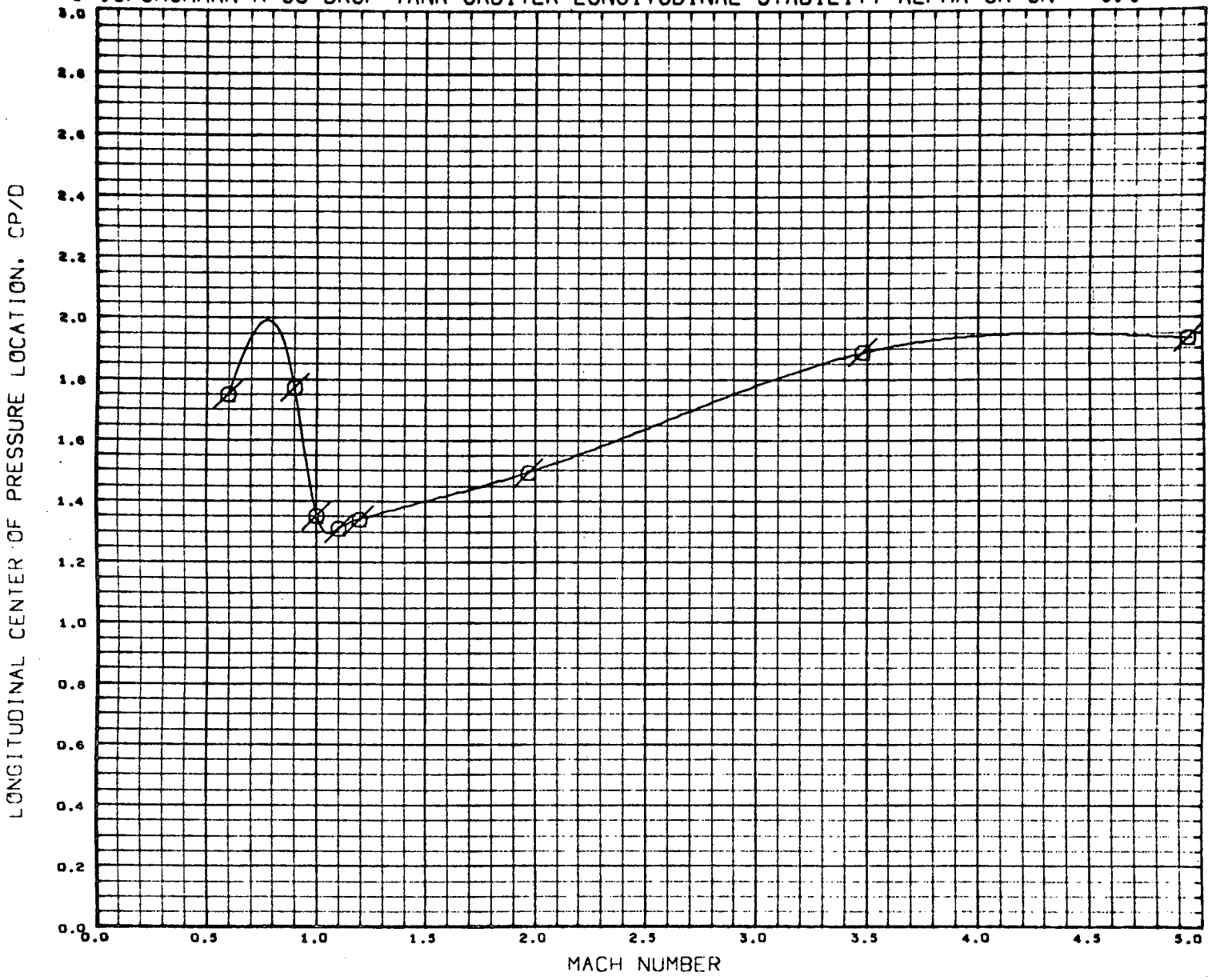
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

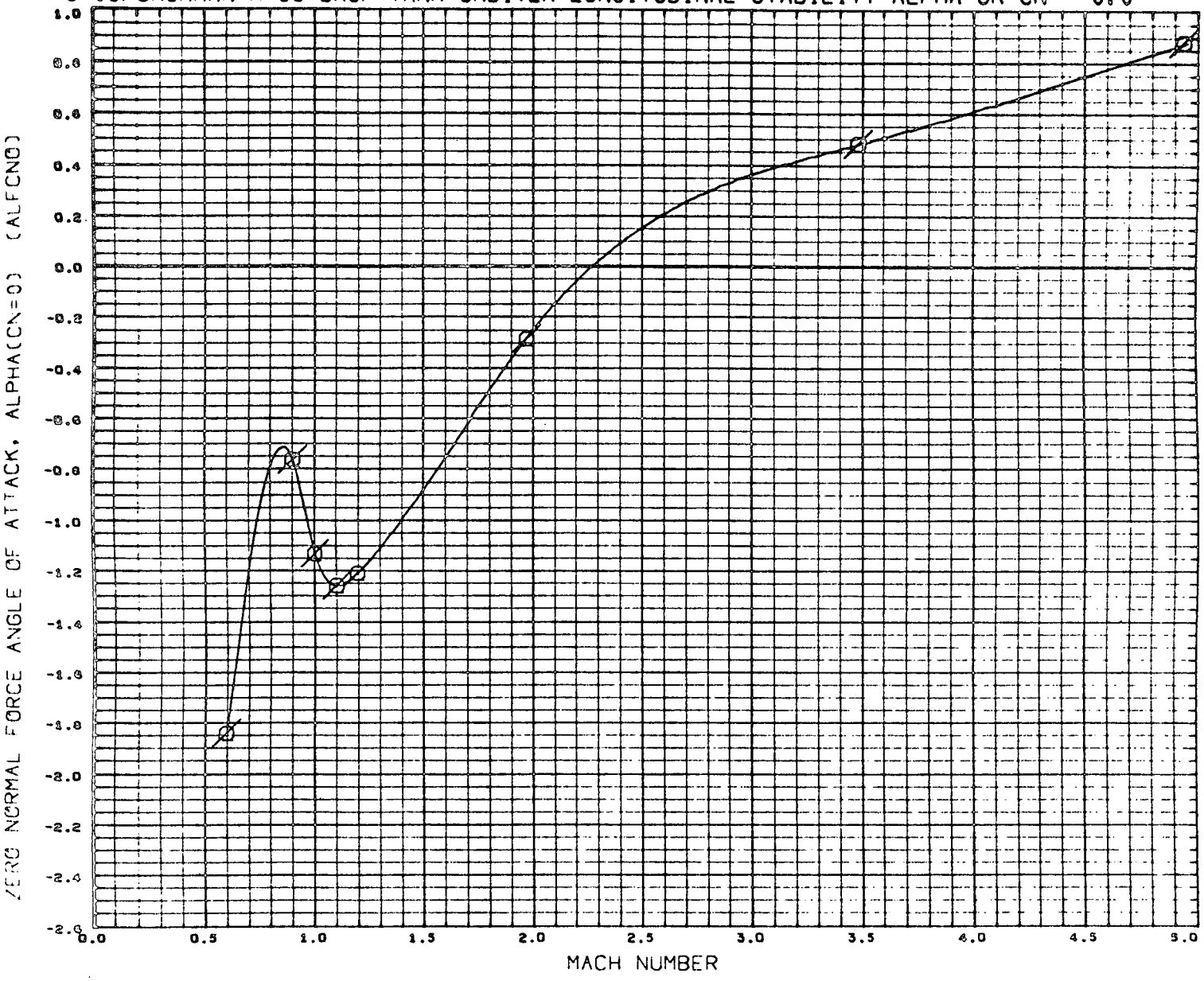
BETA 0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

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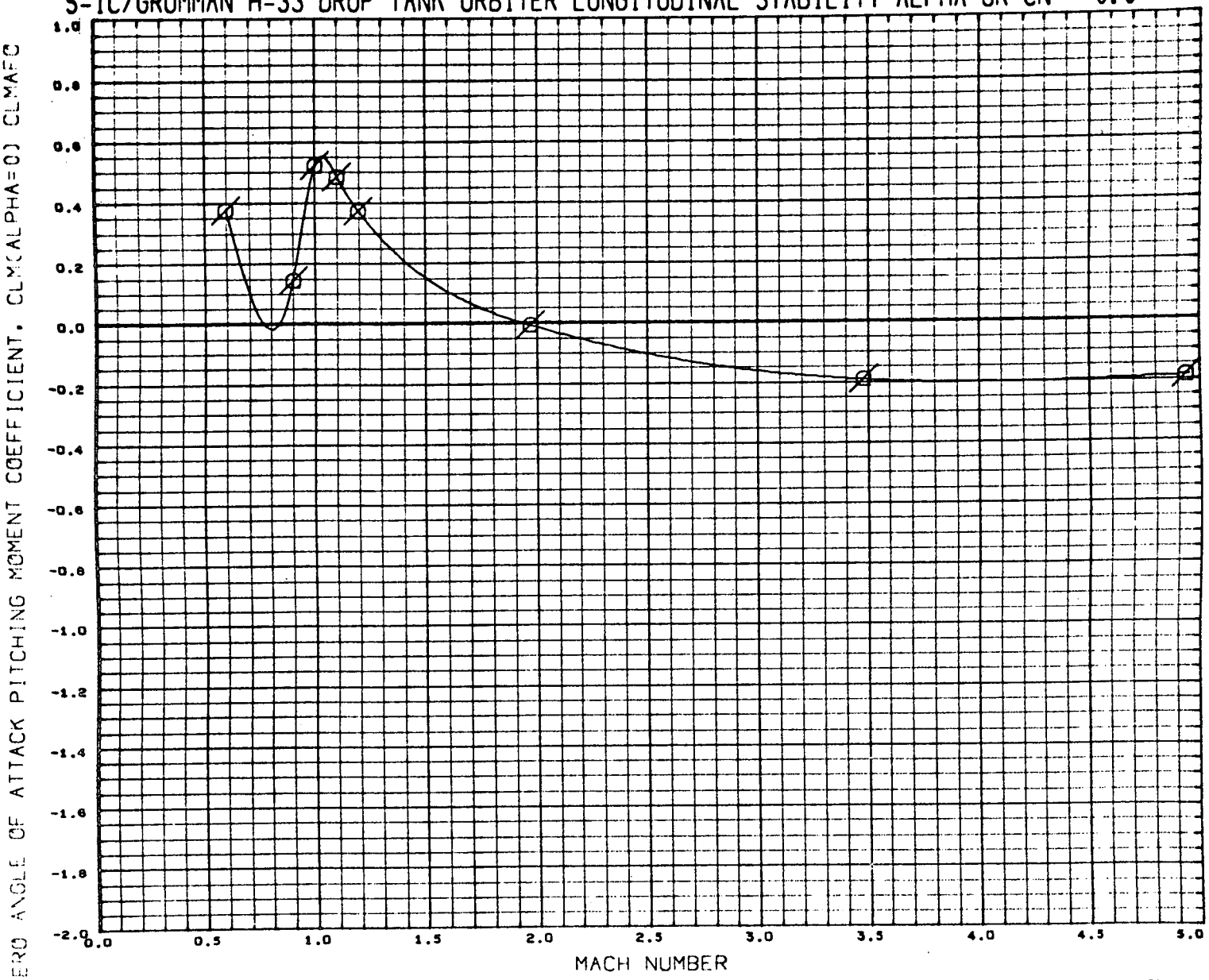
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

DATA MIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

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REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
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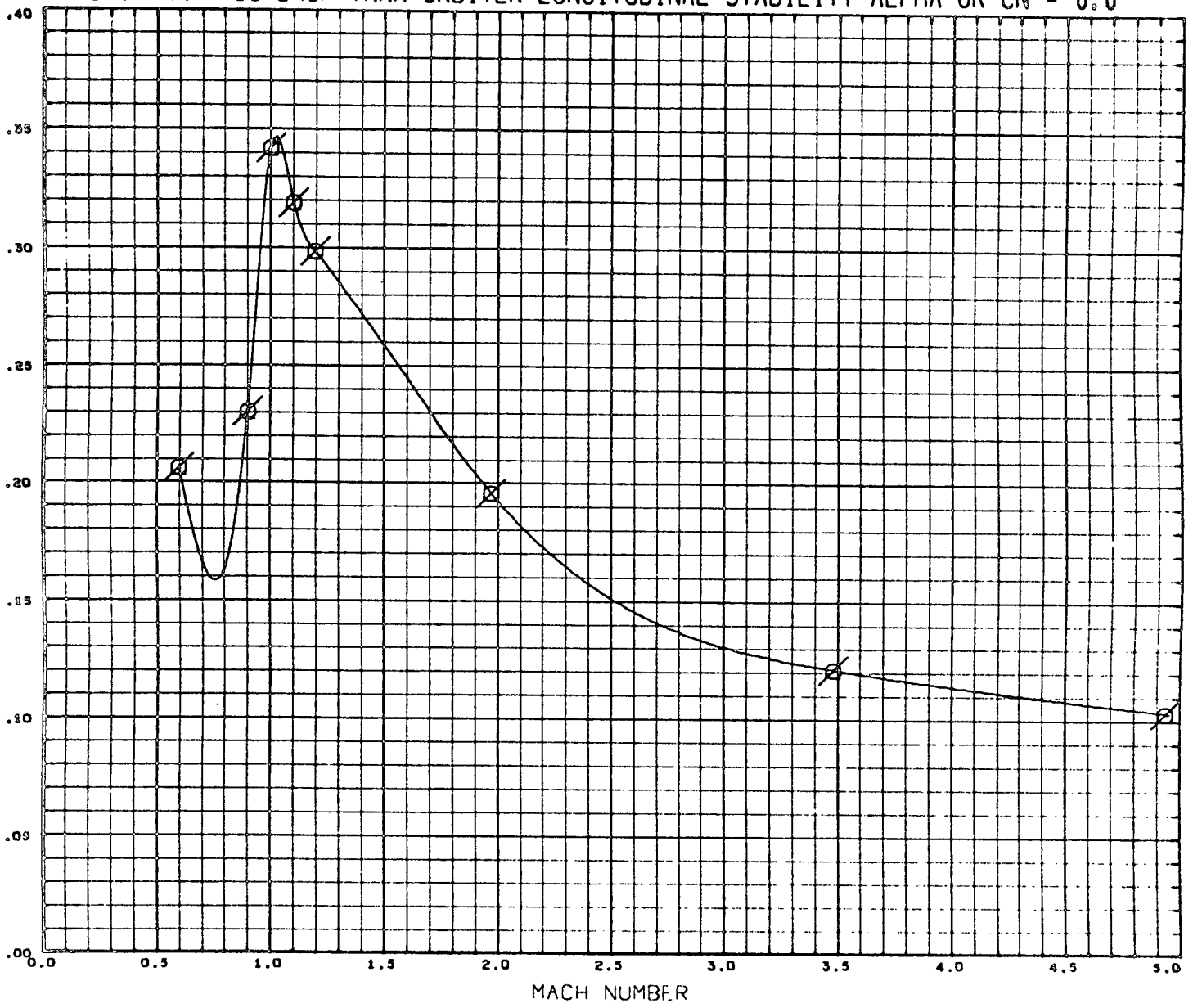
DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

BETA 0.000

DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

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LREF	1.3330	IN.
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XMRP -	5.5070	IN.
YMRP	0.0000	IN.
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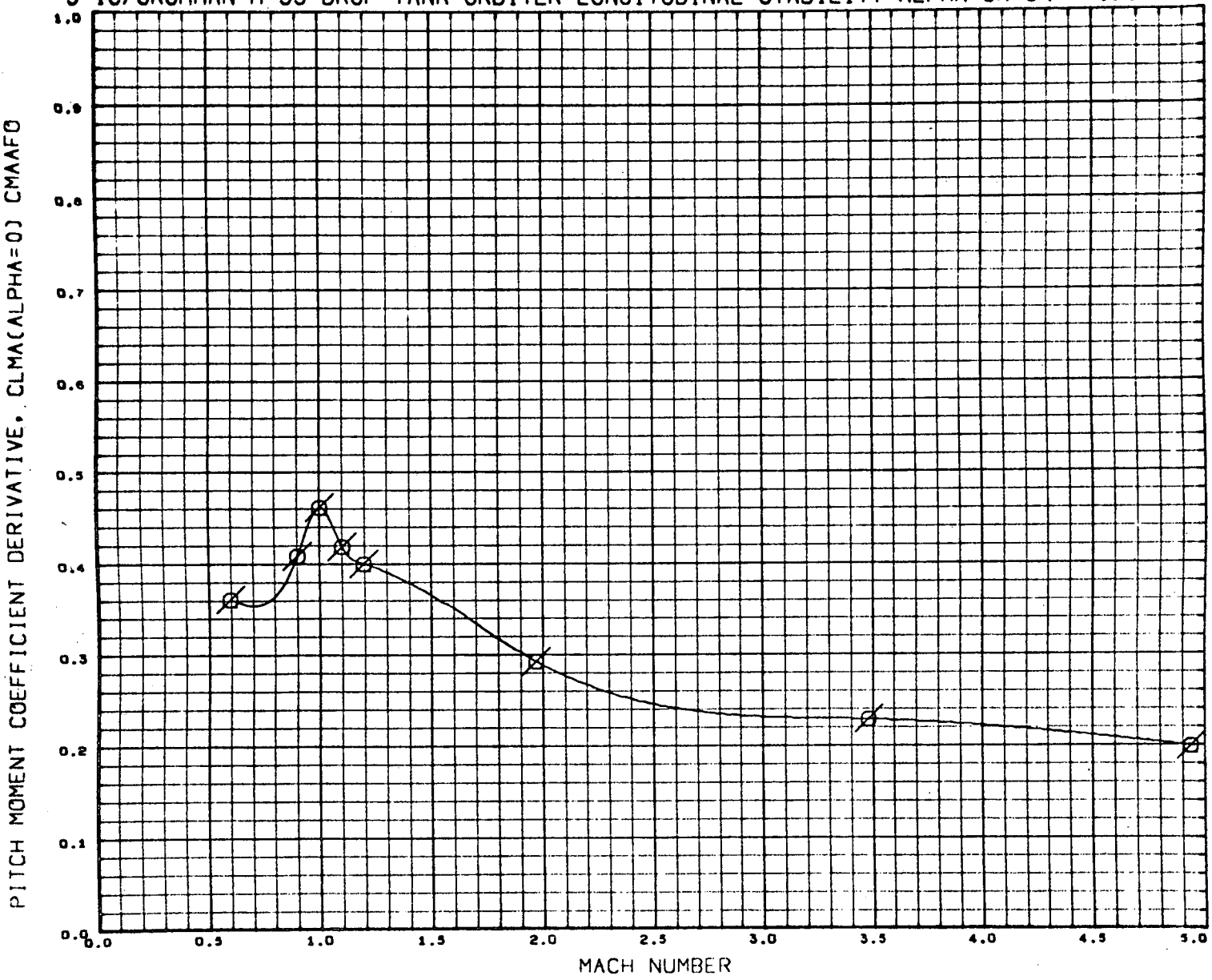
S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

BETA 0.000

DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

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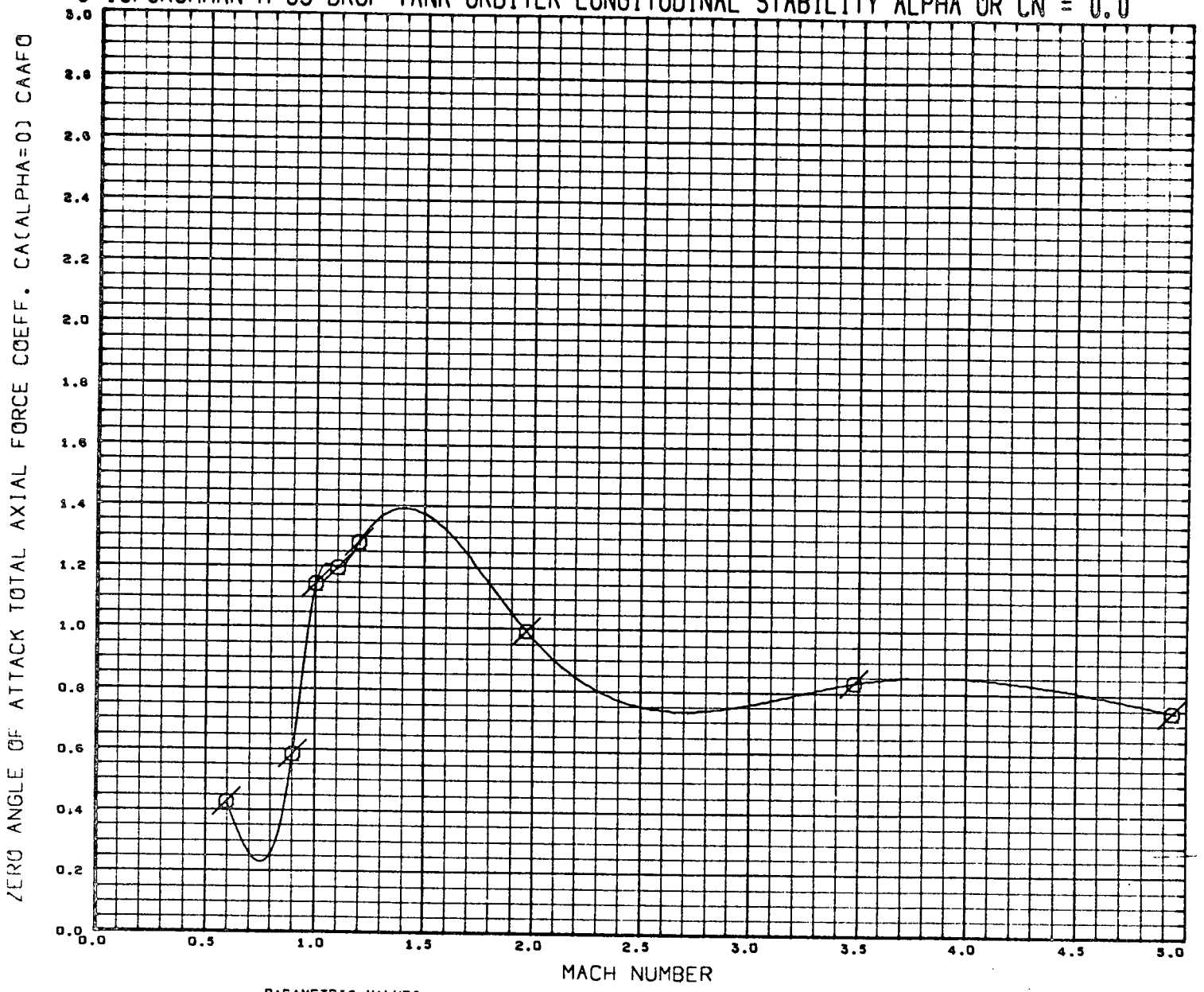
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

BETA 0.000

DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

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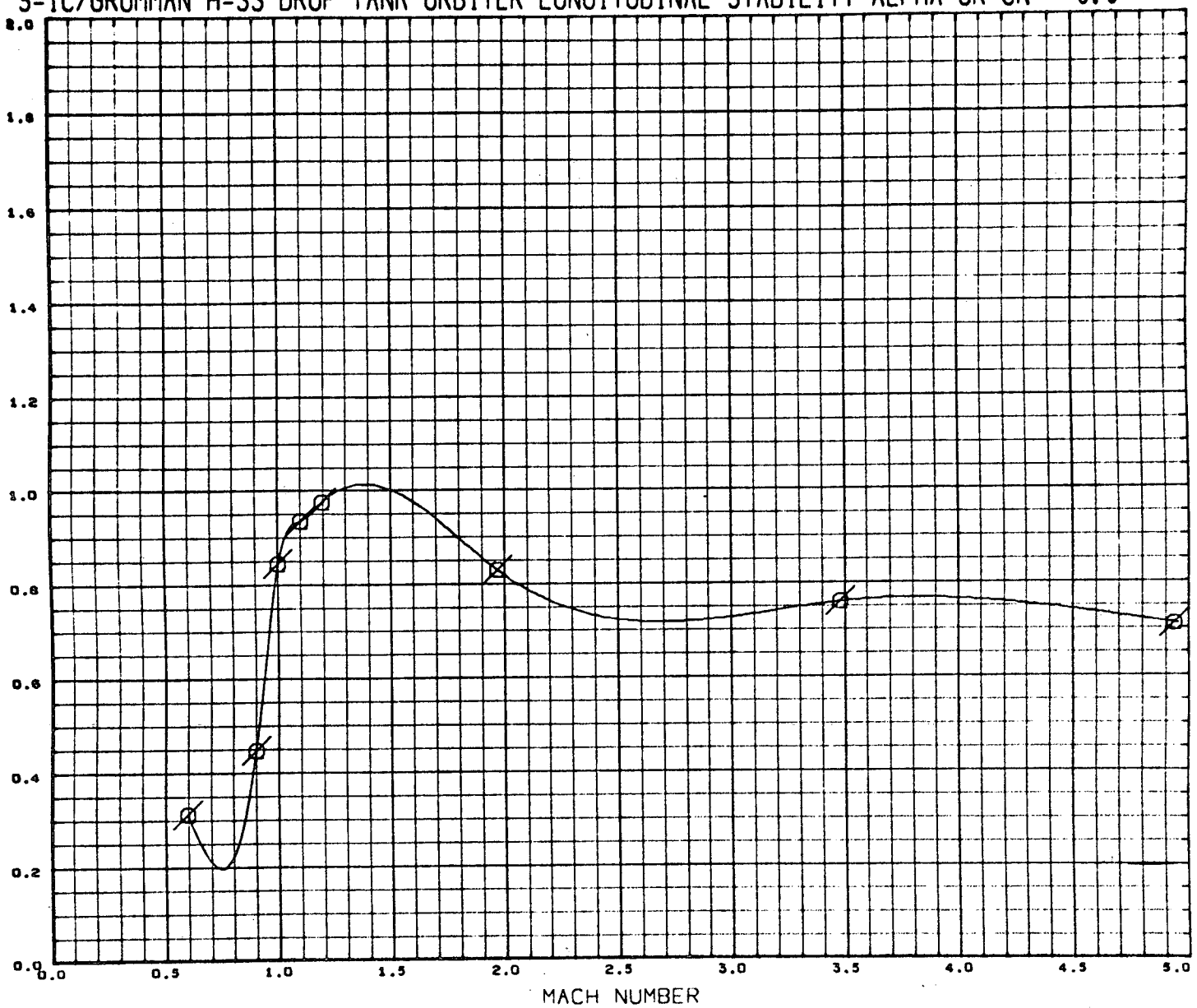
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

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DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

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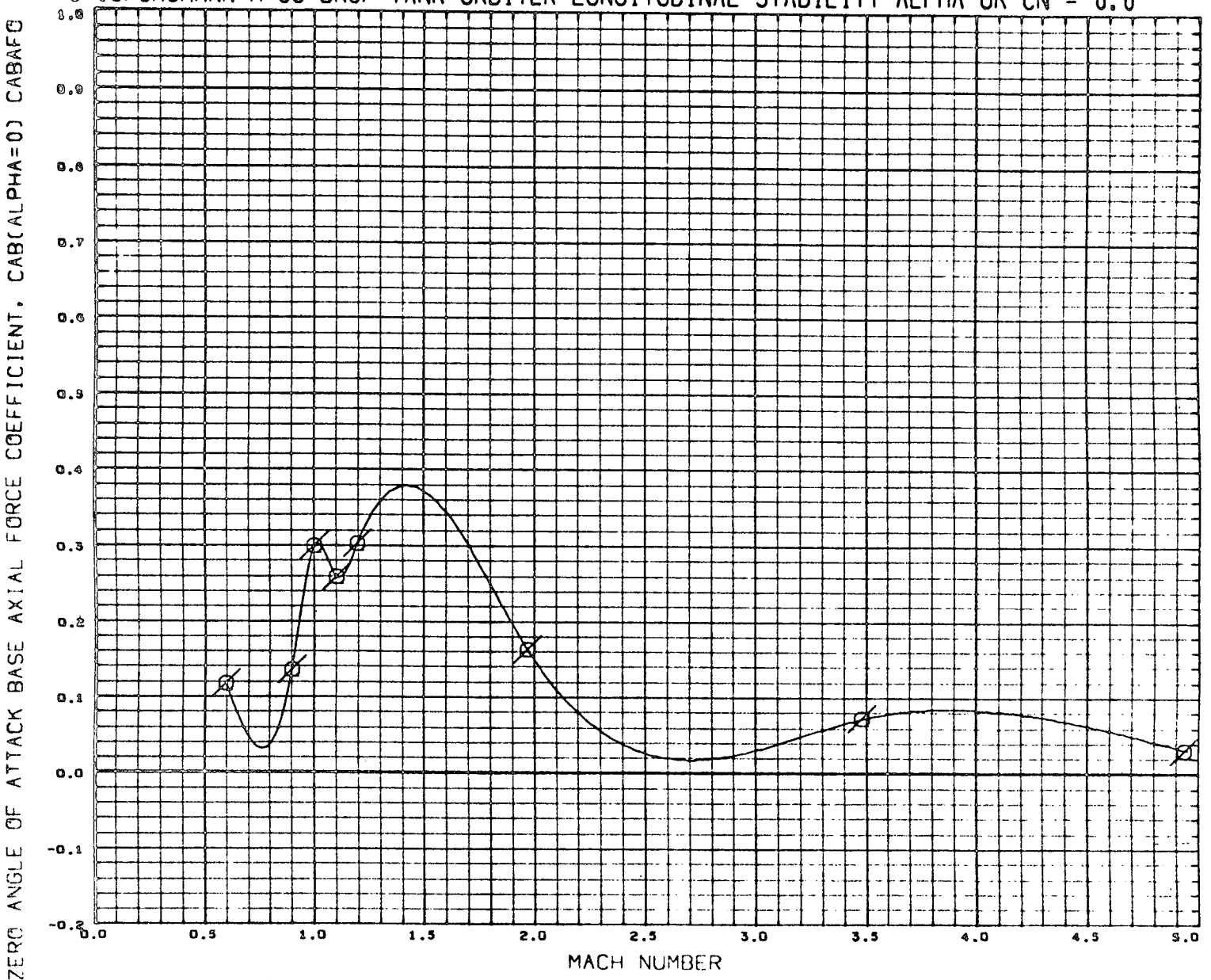
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

BETA 0.000

DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

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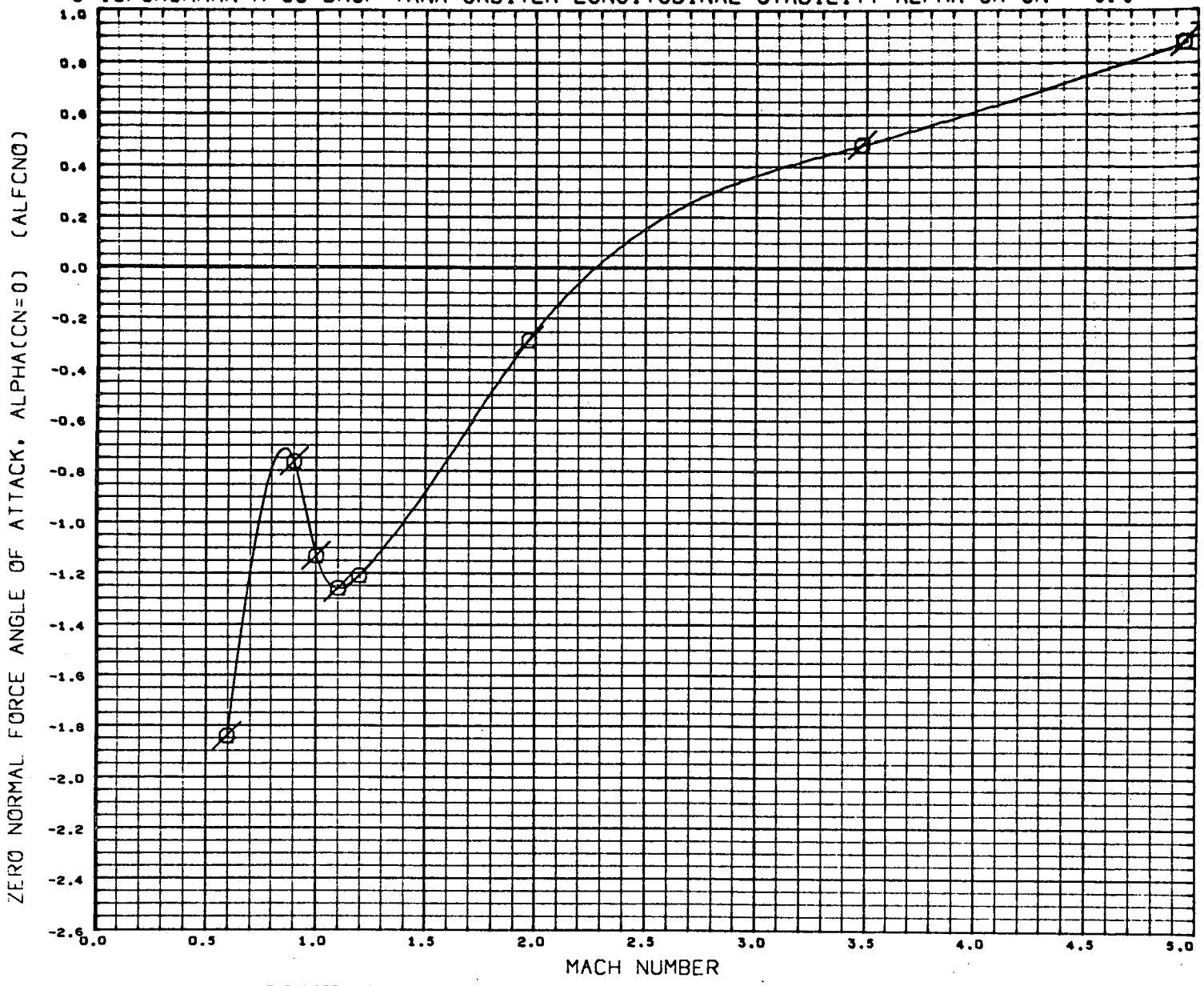
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

S-IC/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

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DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

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BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
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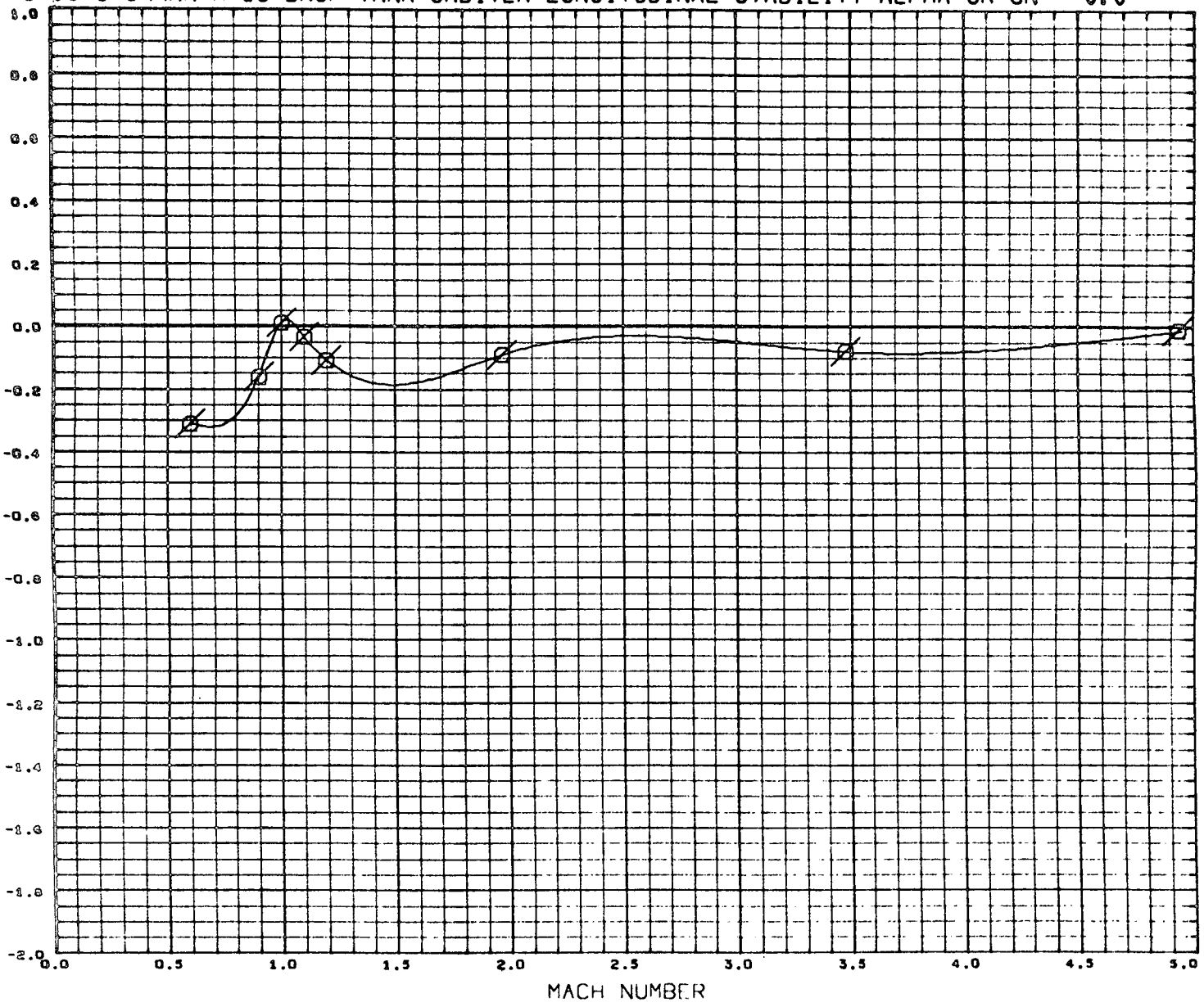
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES

BETA 0.000

REFERENCE INFORMATION

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BREF	1.3330	IN.
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ZMRP -	0.4250	IN.
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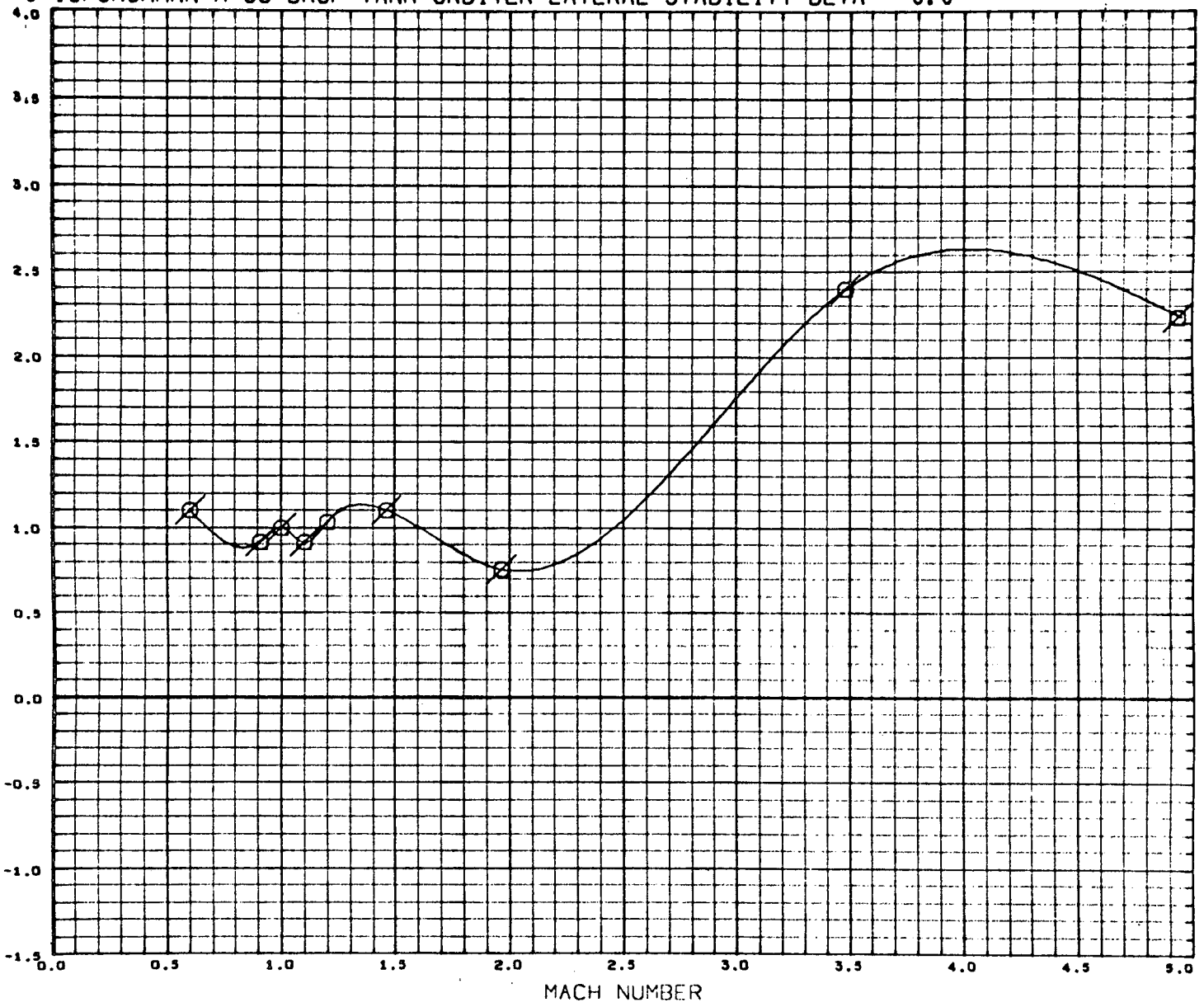
DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

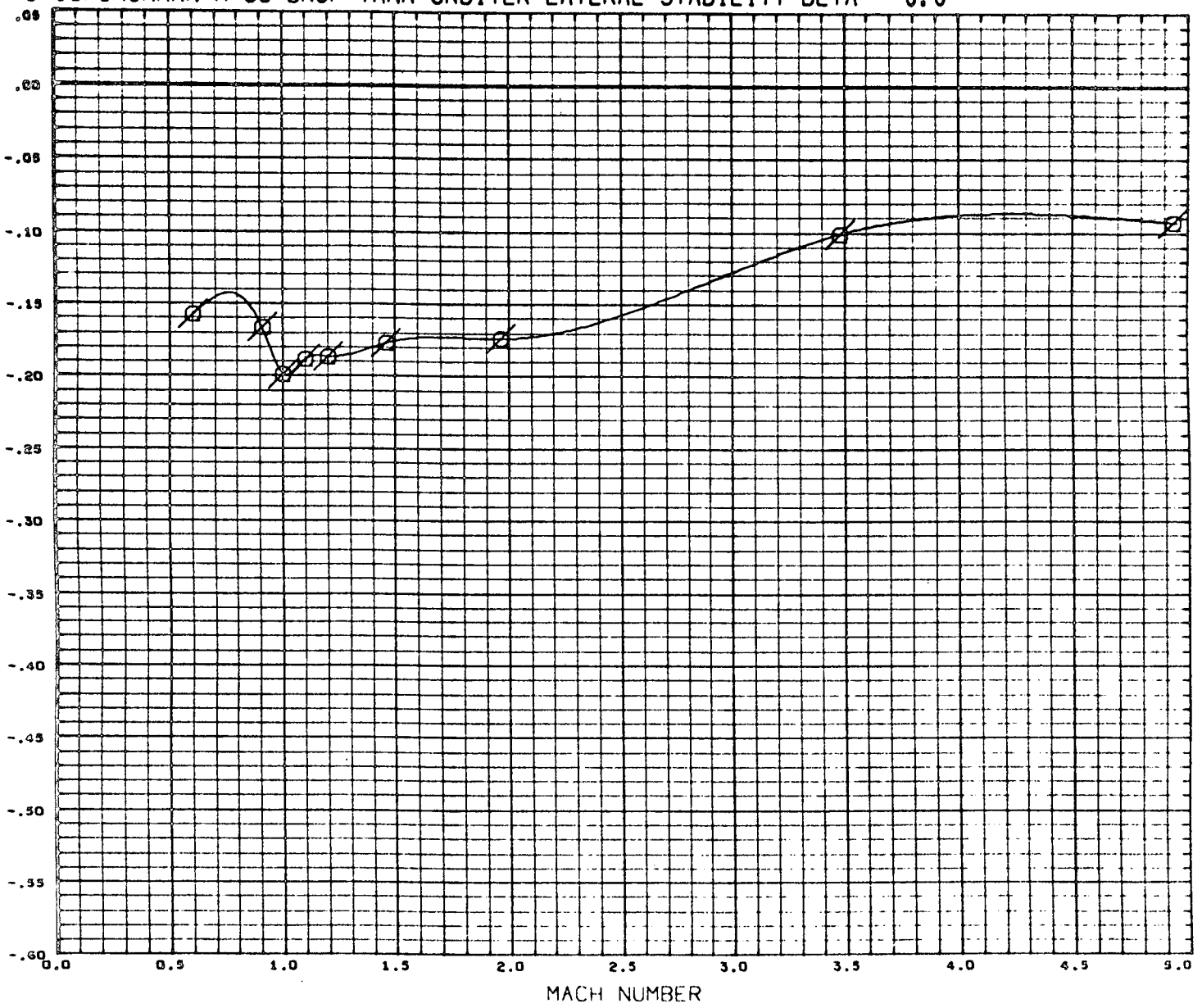
ALPHA	0.000	PHI	90.000
WNGINC	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

ALPHA	0.000	PHI	90.000
WNGINC	0.000		

DATA HIST. CODE *ACCCGCF

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
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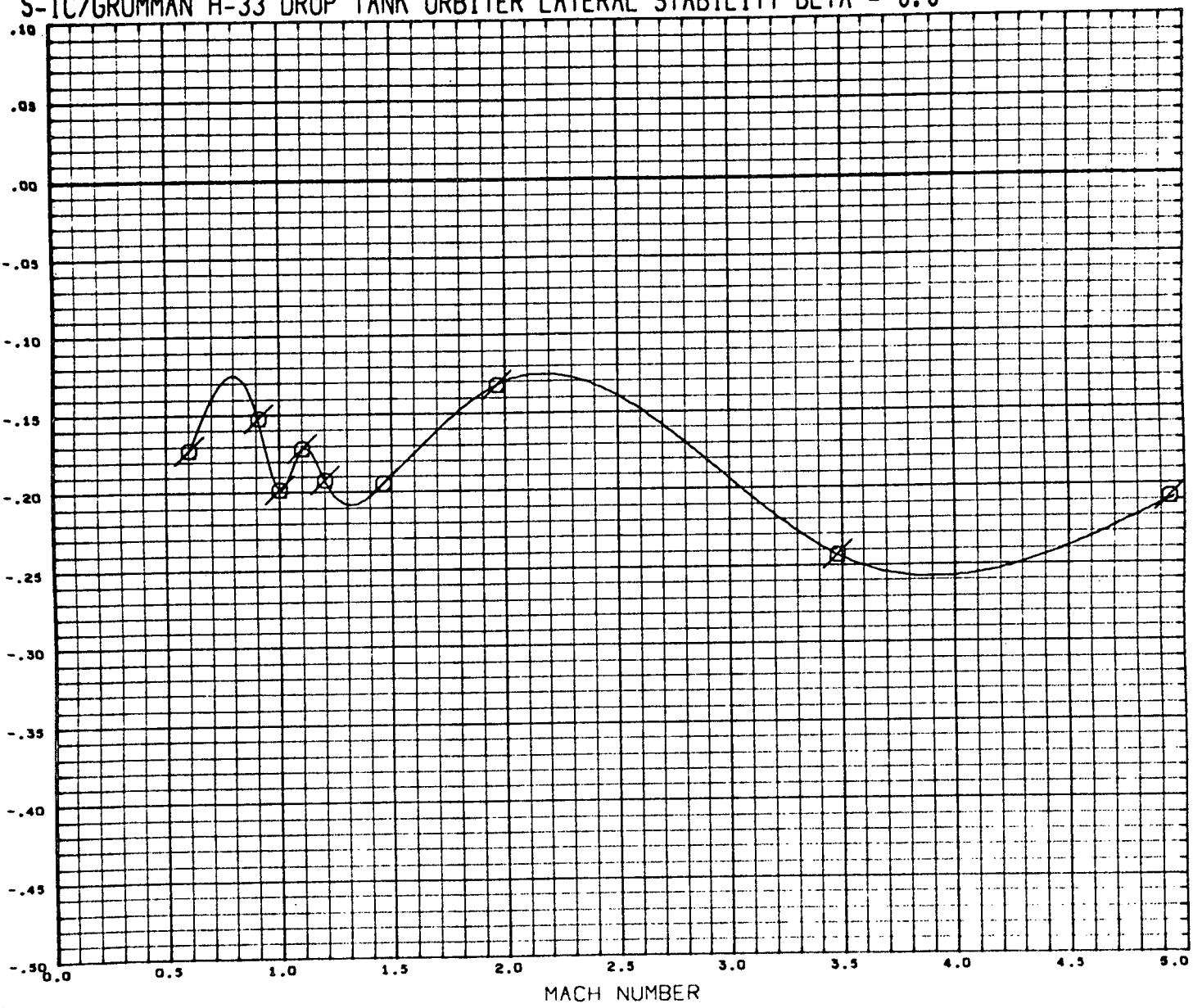
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

ALPHA	0.000	PHI	90.000
WNGINC	0.000		

REFERENCE INFORMATION

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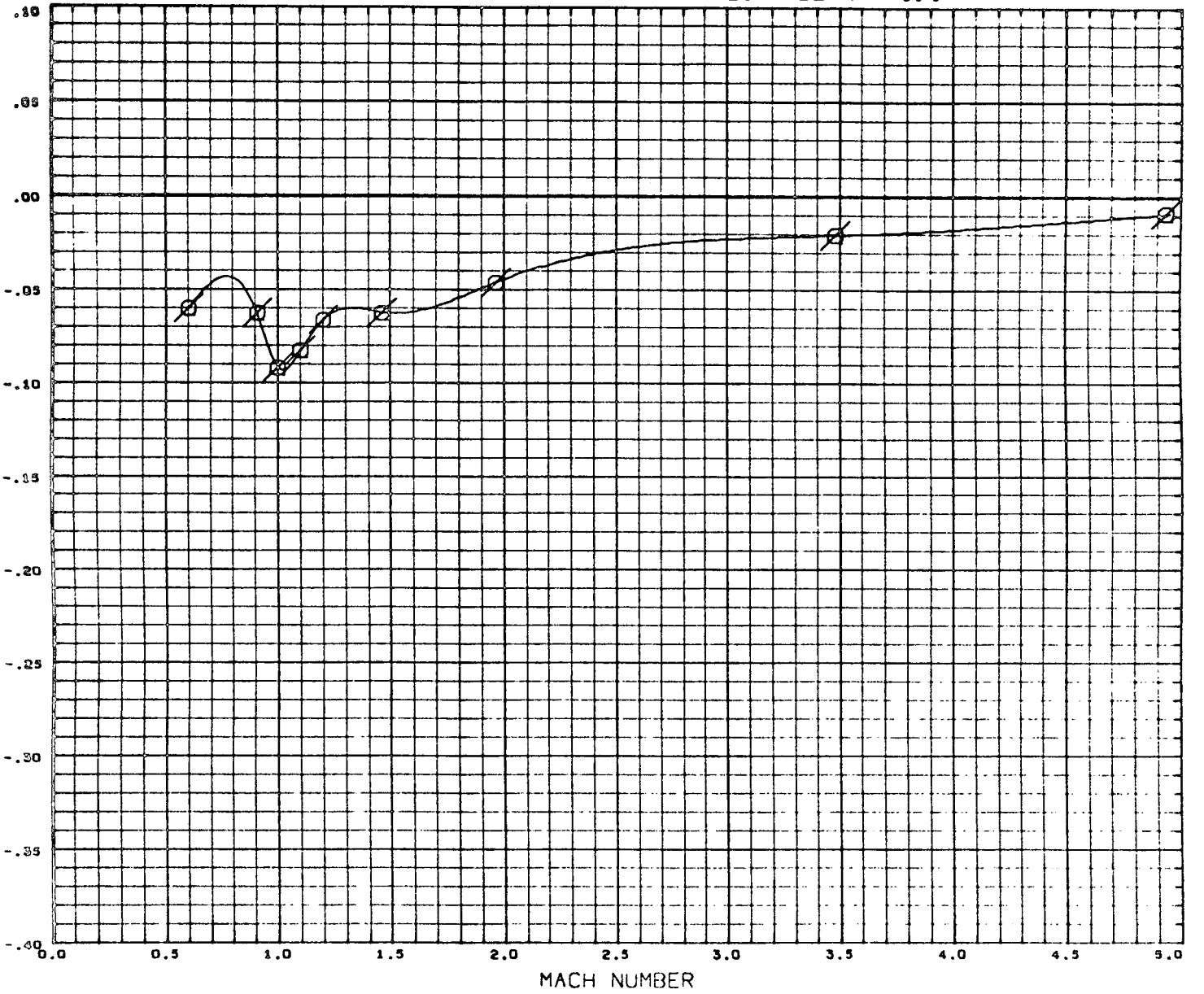
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

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WNGINC	0.000		

DATA HIST. CODE *ACCCGCF

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XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0

PARAMETRIC VALUES

ALPHA	0.000	PHI	90.000
WNGIN	0.000		

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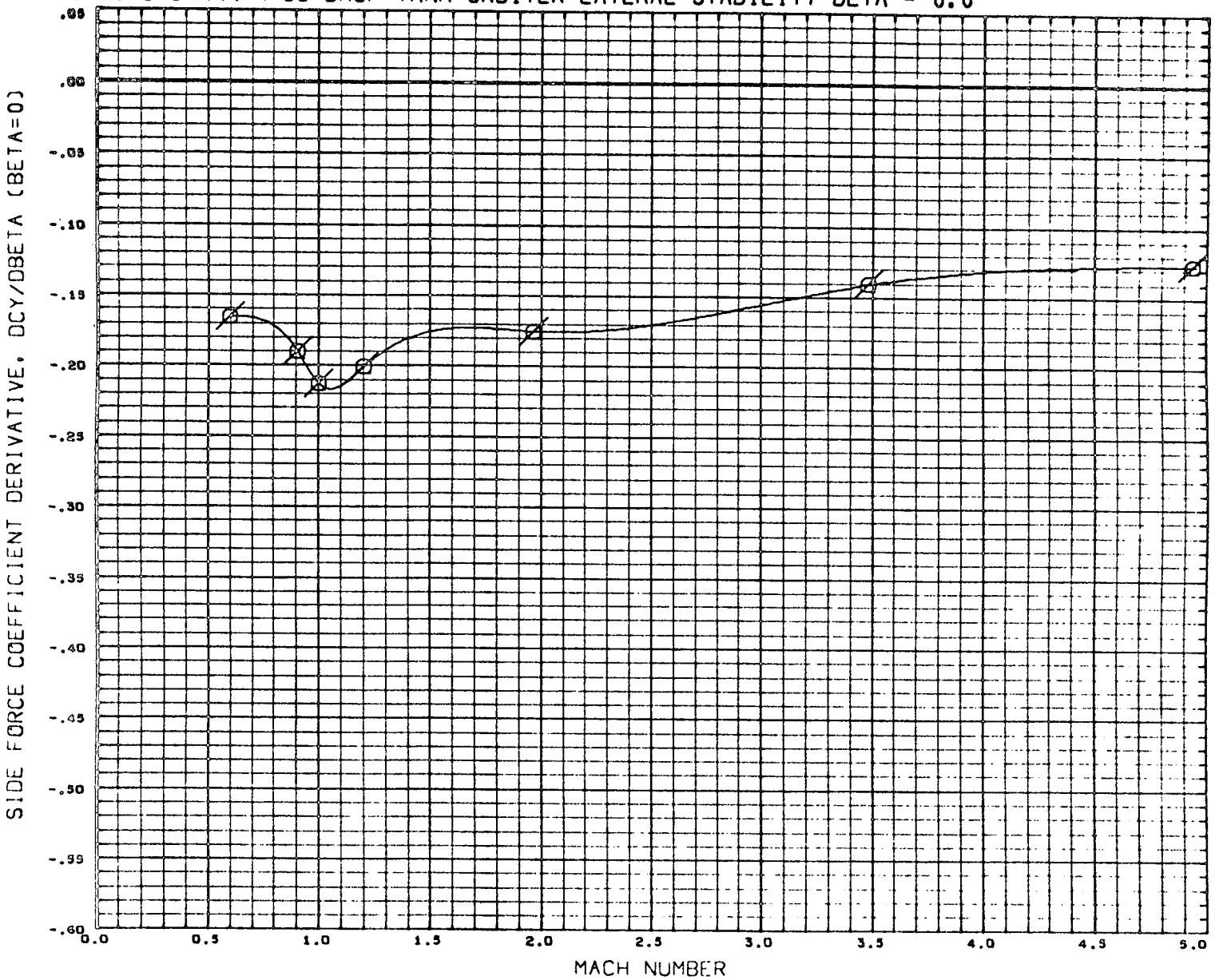
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

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DATA HIST. CODE CCCGCF

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YMRP	0.0000	IN.
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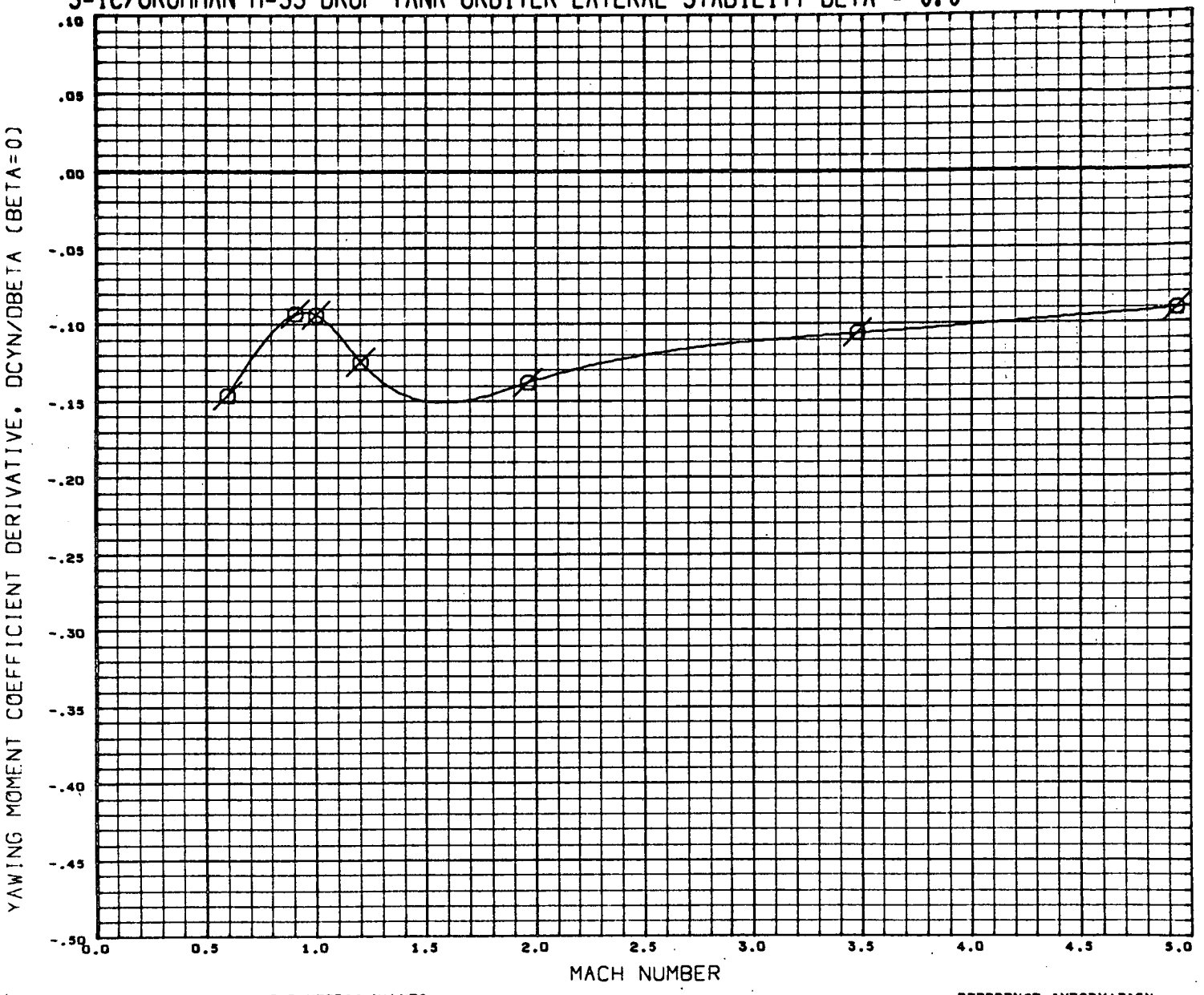
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

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WNGIN	0.000		

DATA HIST. CODE CCCGCF

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BREF	1.3330	IN.
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YMRP	0.0000	IN.
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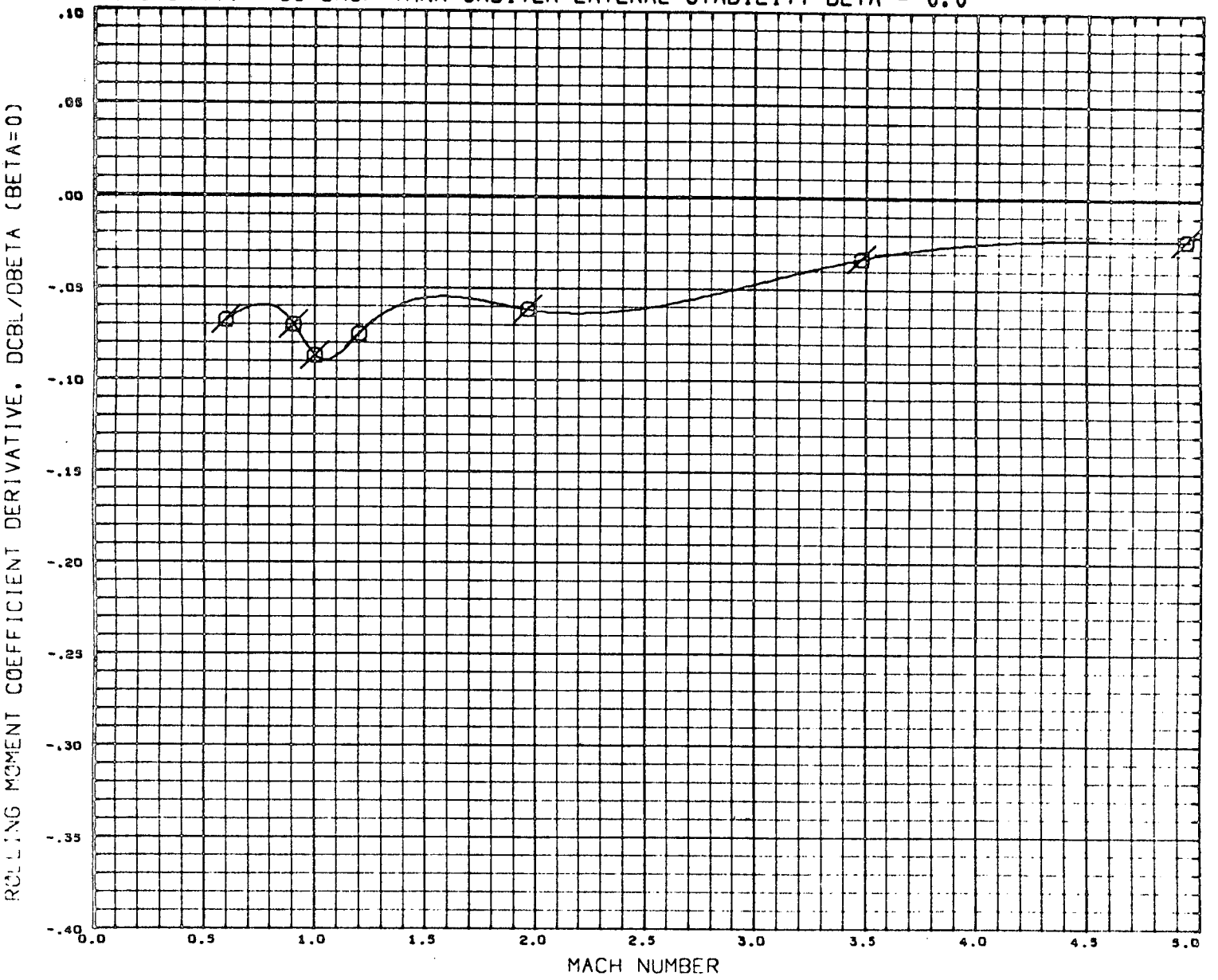
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

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WNGIN	0.000		

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XMRP	5.3990	IN.
YMRP	0.0000	IN.
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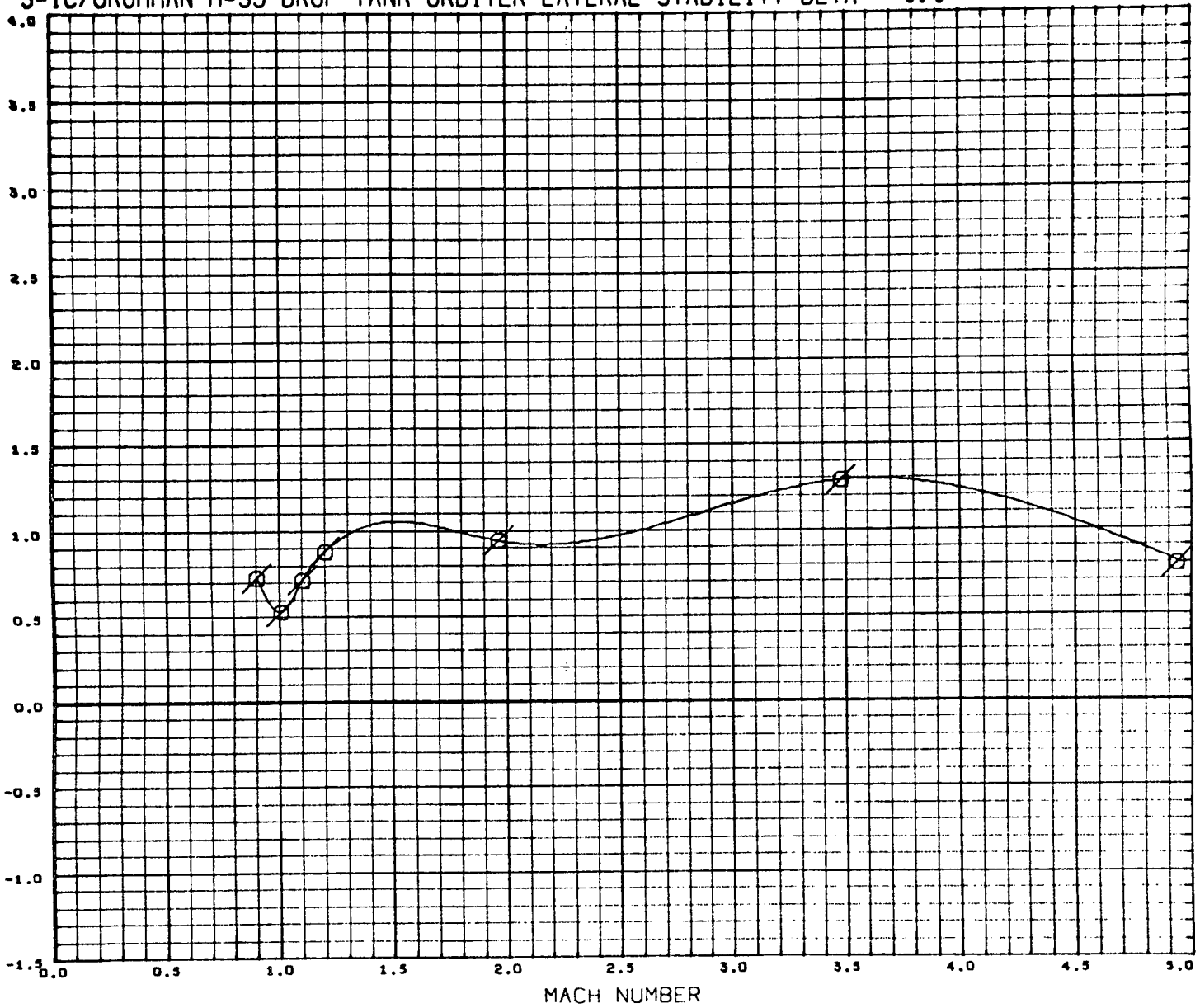
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

ALPHA	0.000	PHI	90.000
WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
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XMRP	5.3990	IN.
YMRP	0.0000	IN.
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DATA HIST. CODE CCCGCF

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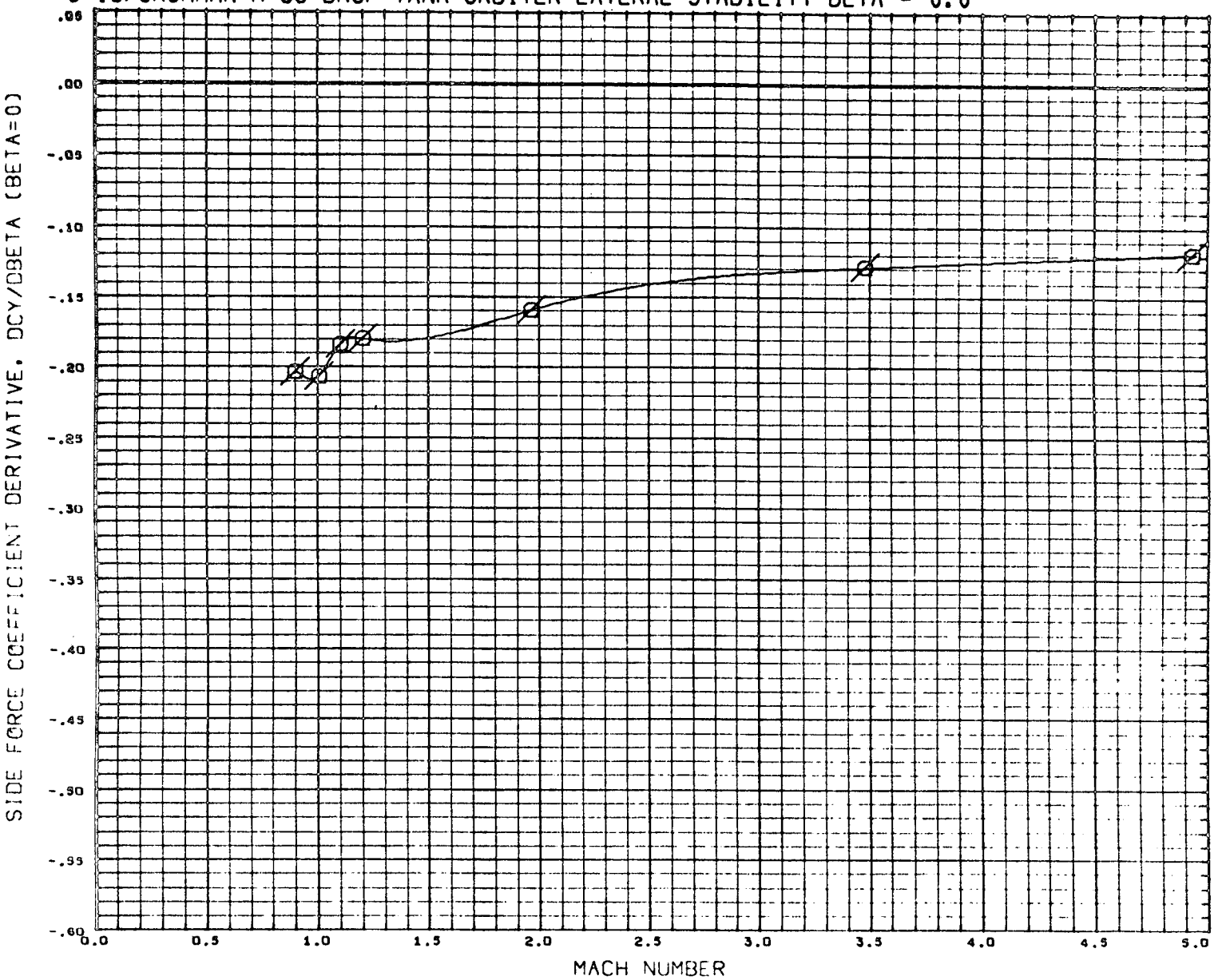

PARAMETRIC VALUES

ALPHA	0.000	PHI	90.000
WNGIN	0.000		

DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

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LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
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SCALE	0.0034	

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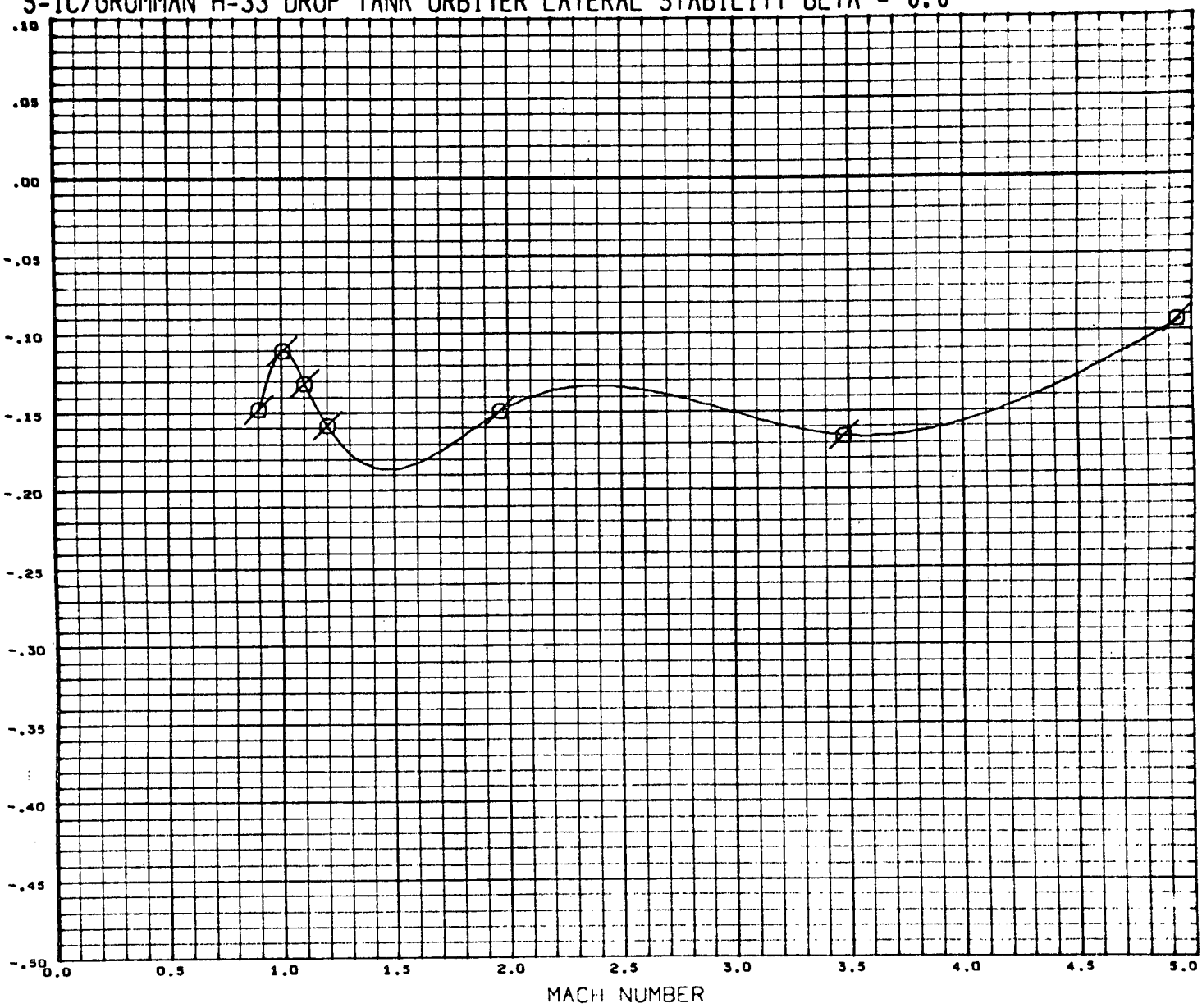

PARAMETRIC VALUES

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WNGIN	0.000		

REFERENCE INFORMATION

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XMRP	5.3990	IN.
YMRP	0.0000	IN.
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DATA HIST. CODE CCCGCF

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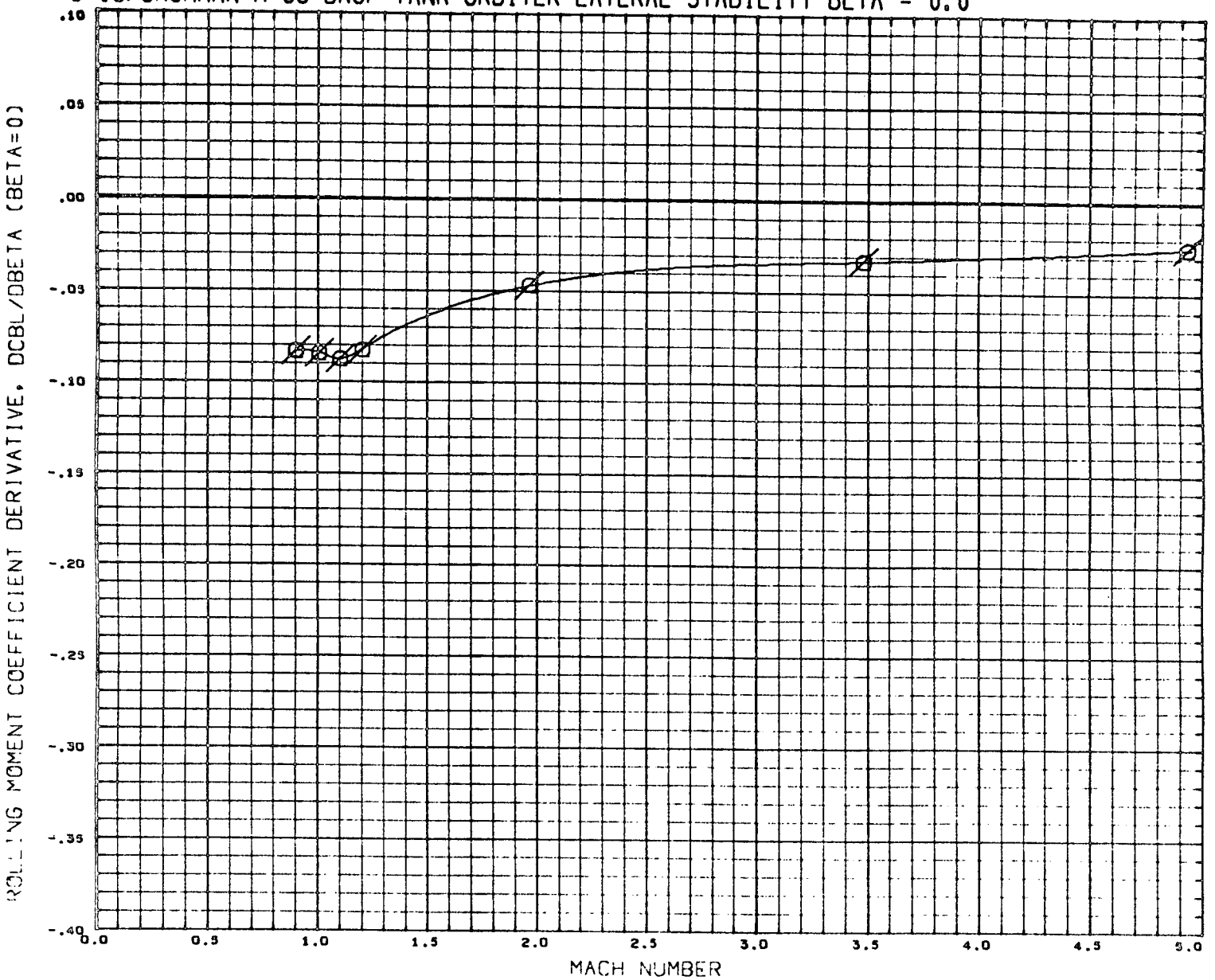

PARAMETRIC VALUES

ALPHA	0.000	PHI	90.000
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DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

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BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0

PARAMETRIC VALUES

ALPHA	0.000	PHI	90.000
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DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

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XMRP	5.3990	IN.
YMRP	0.0000	IN.
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SCALE	0.0034	

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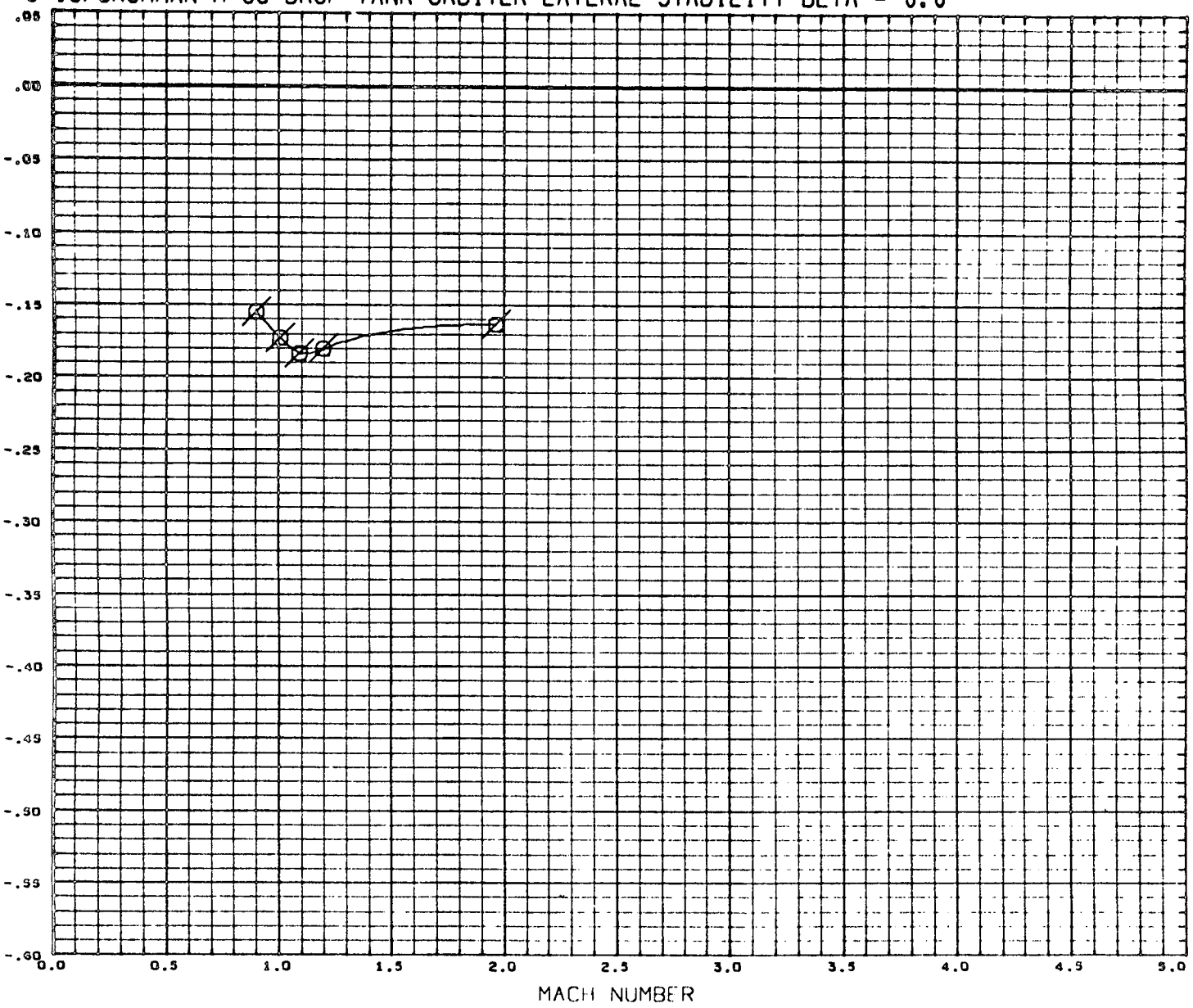

PARAMETRIC VALUES

ALPHA	0.000	PHI	90.000
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SREF	1.3960	SQ.IN.
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BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0

PARAMETRIC VALUES

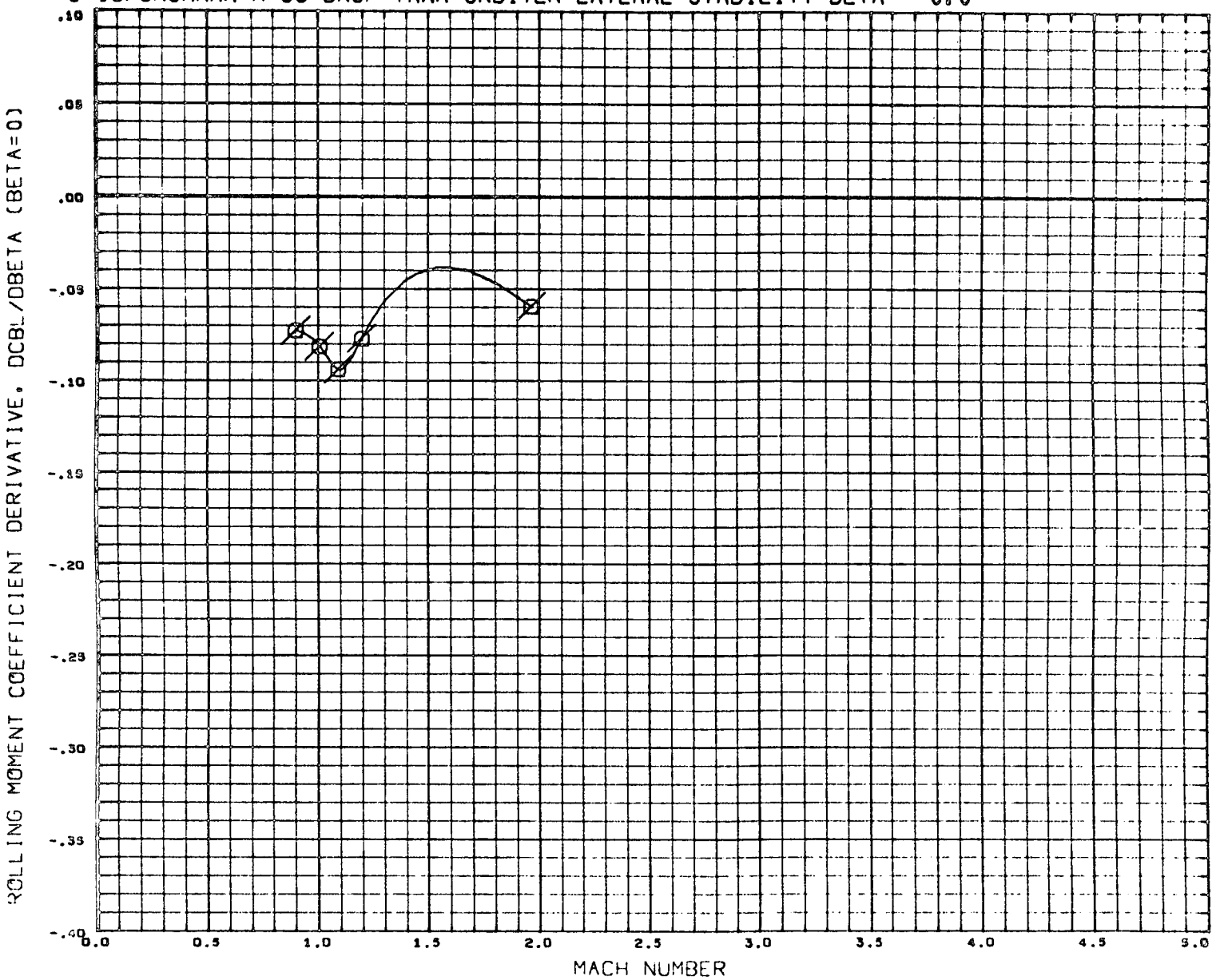
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

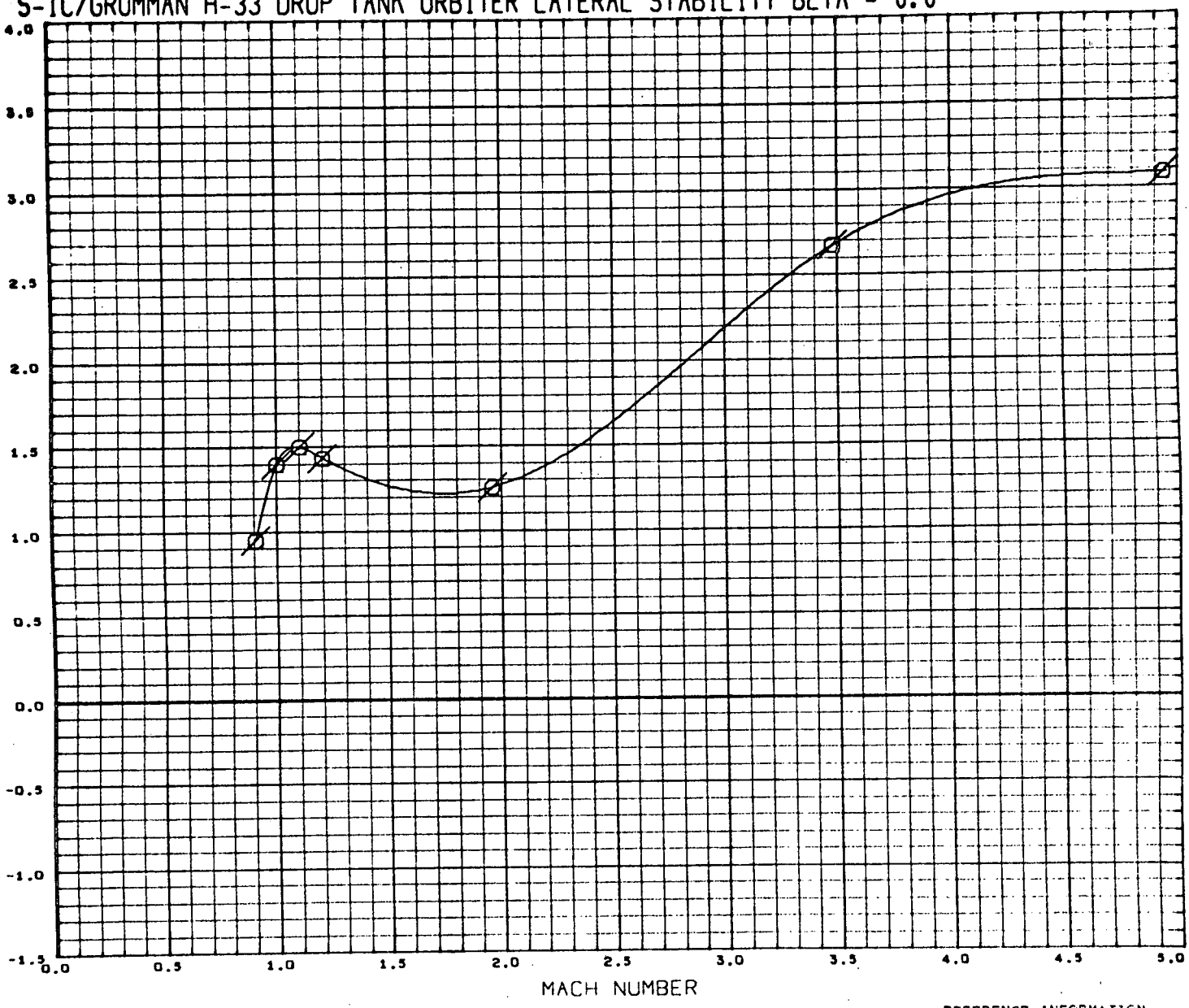
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

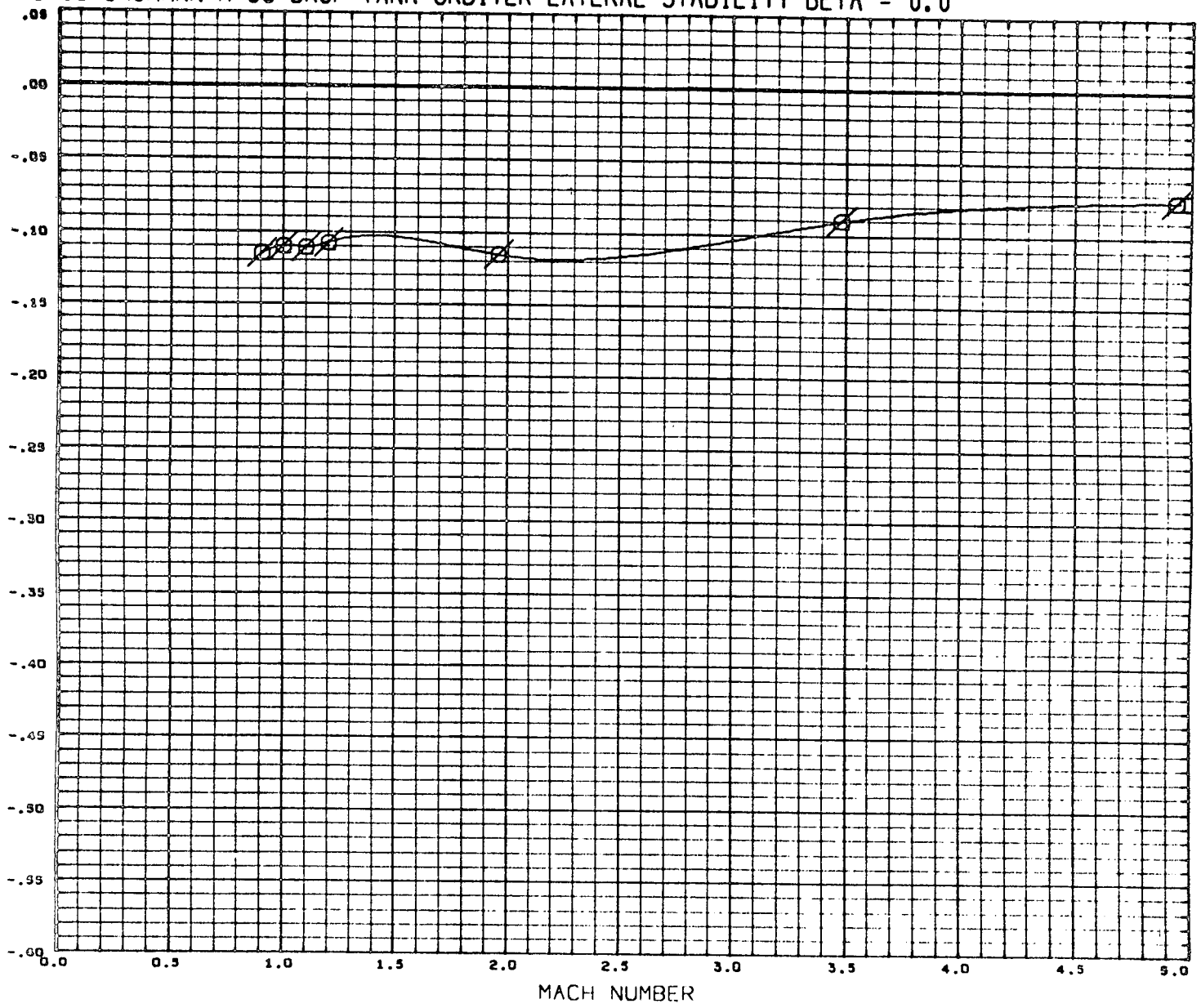
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

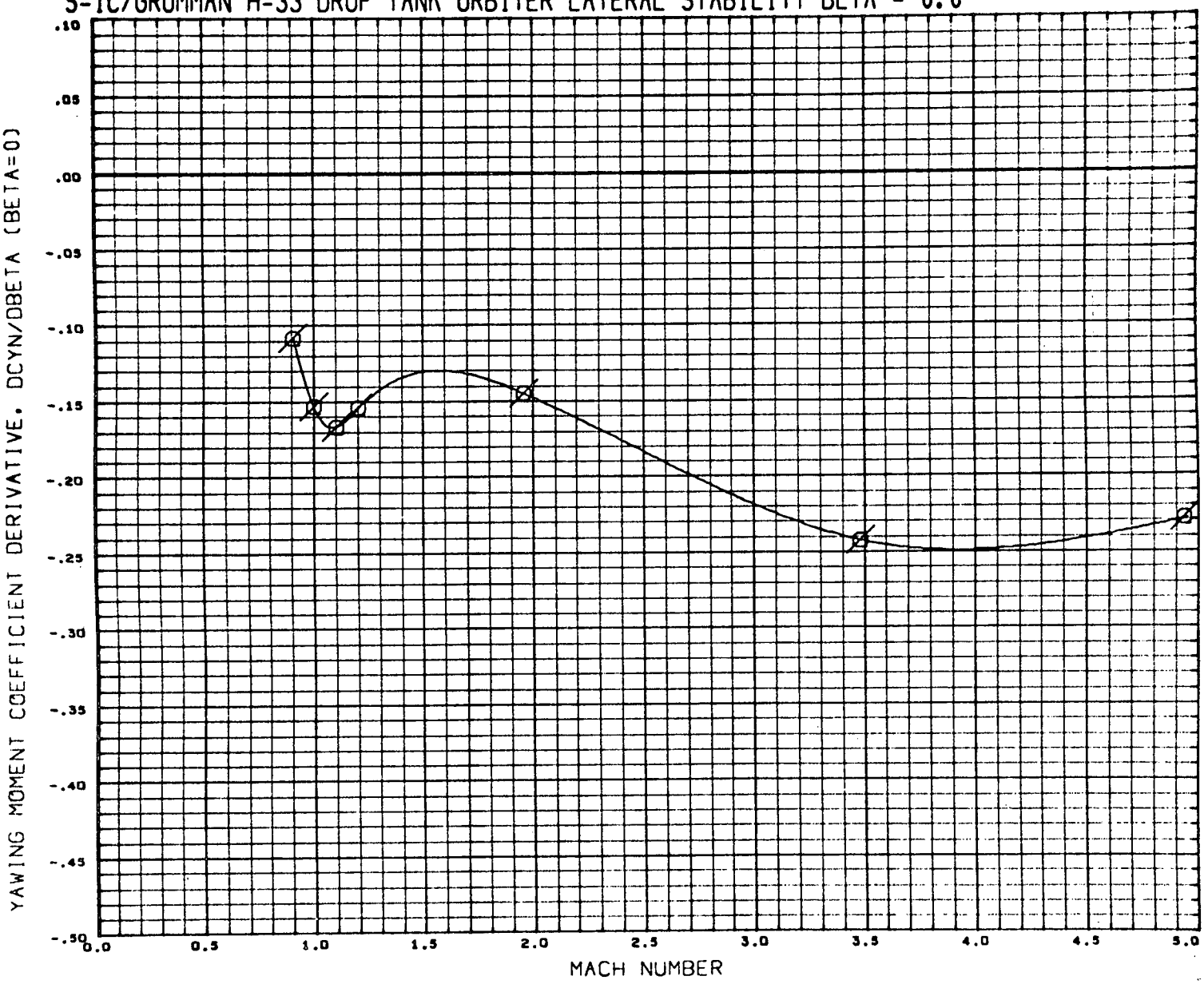
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

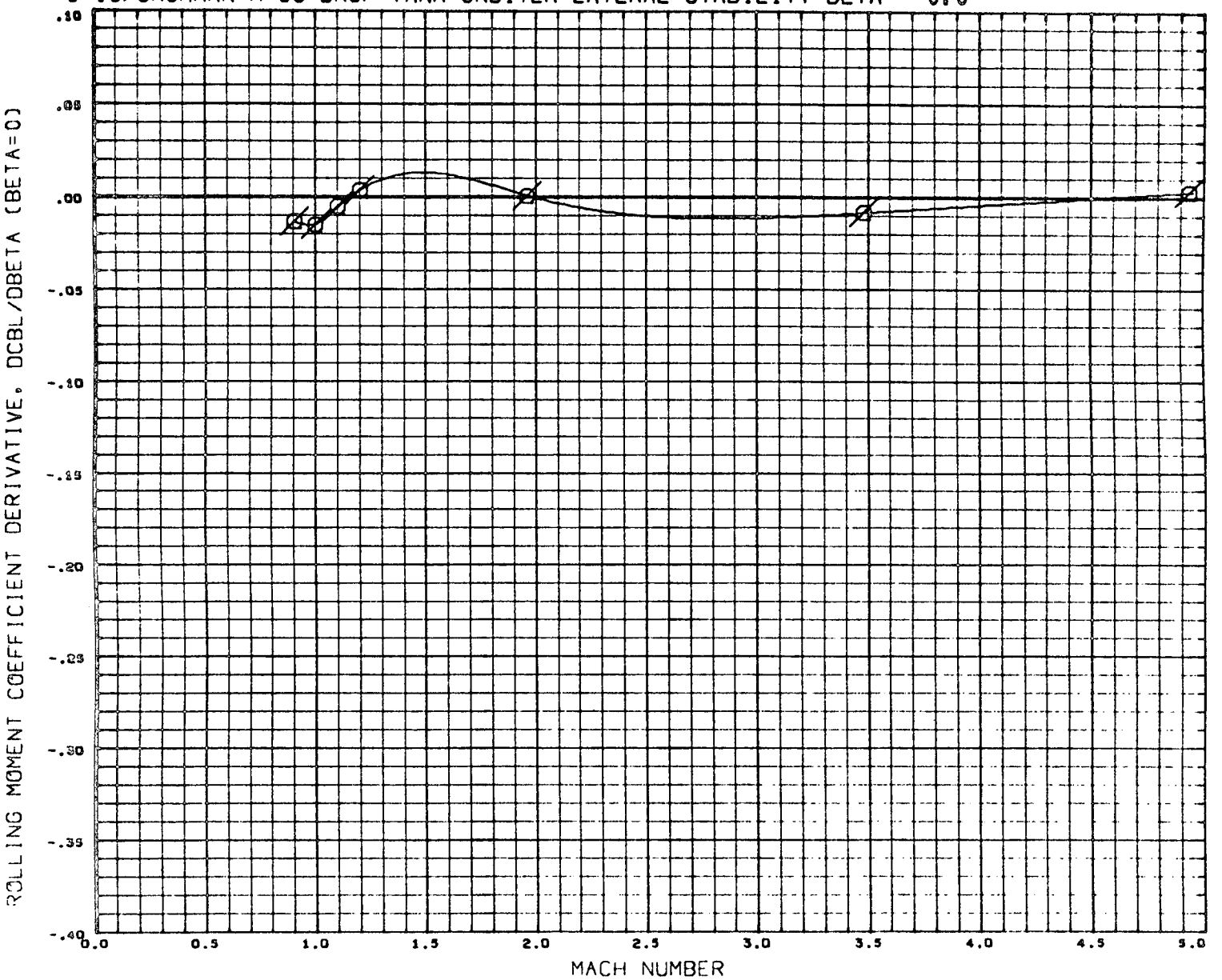
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-IC/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

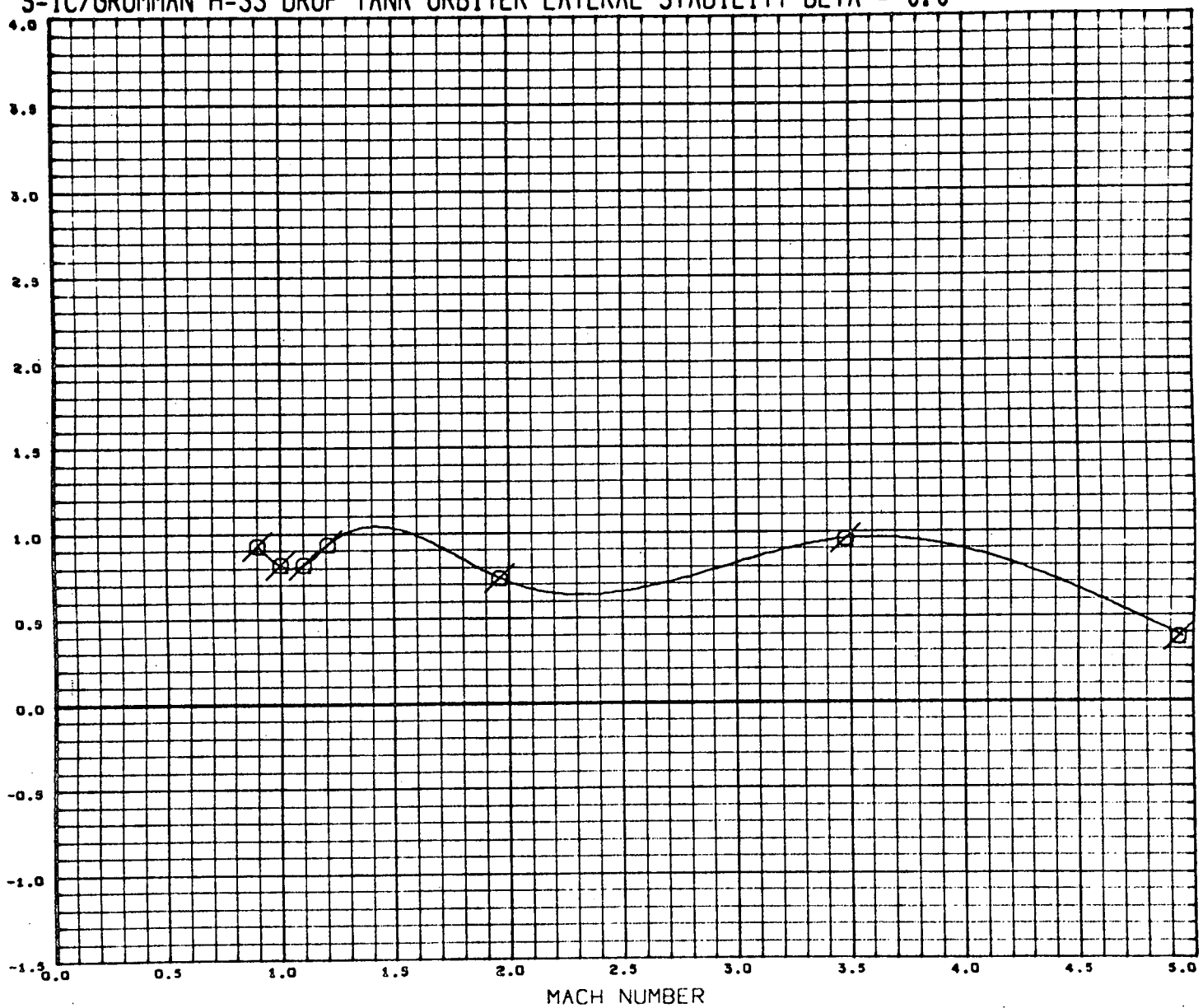
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

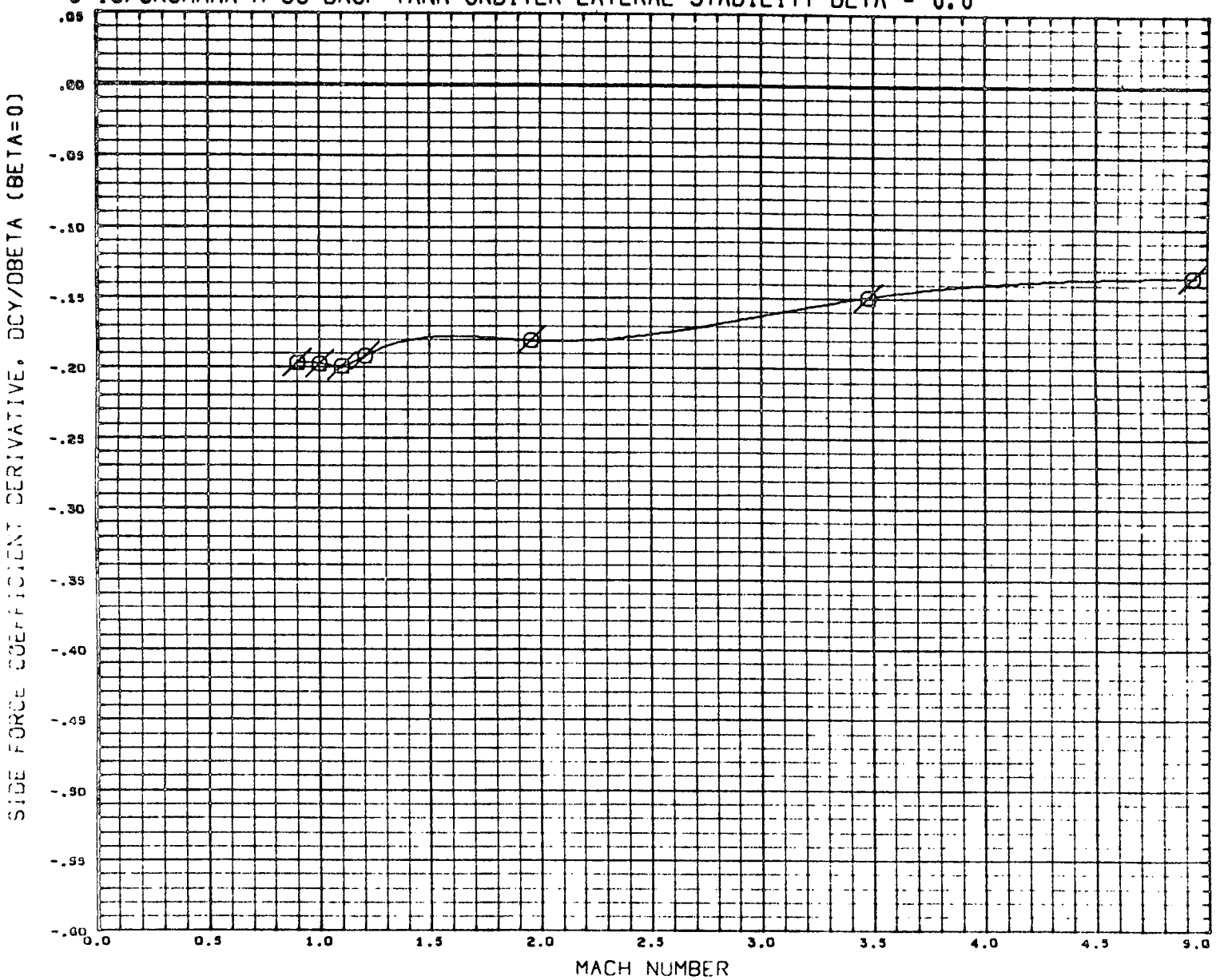
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

ALPHA	0.000	PHI	90.000
WNGIN	0.000		

DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0

PARAMETRIC VALUES

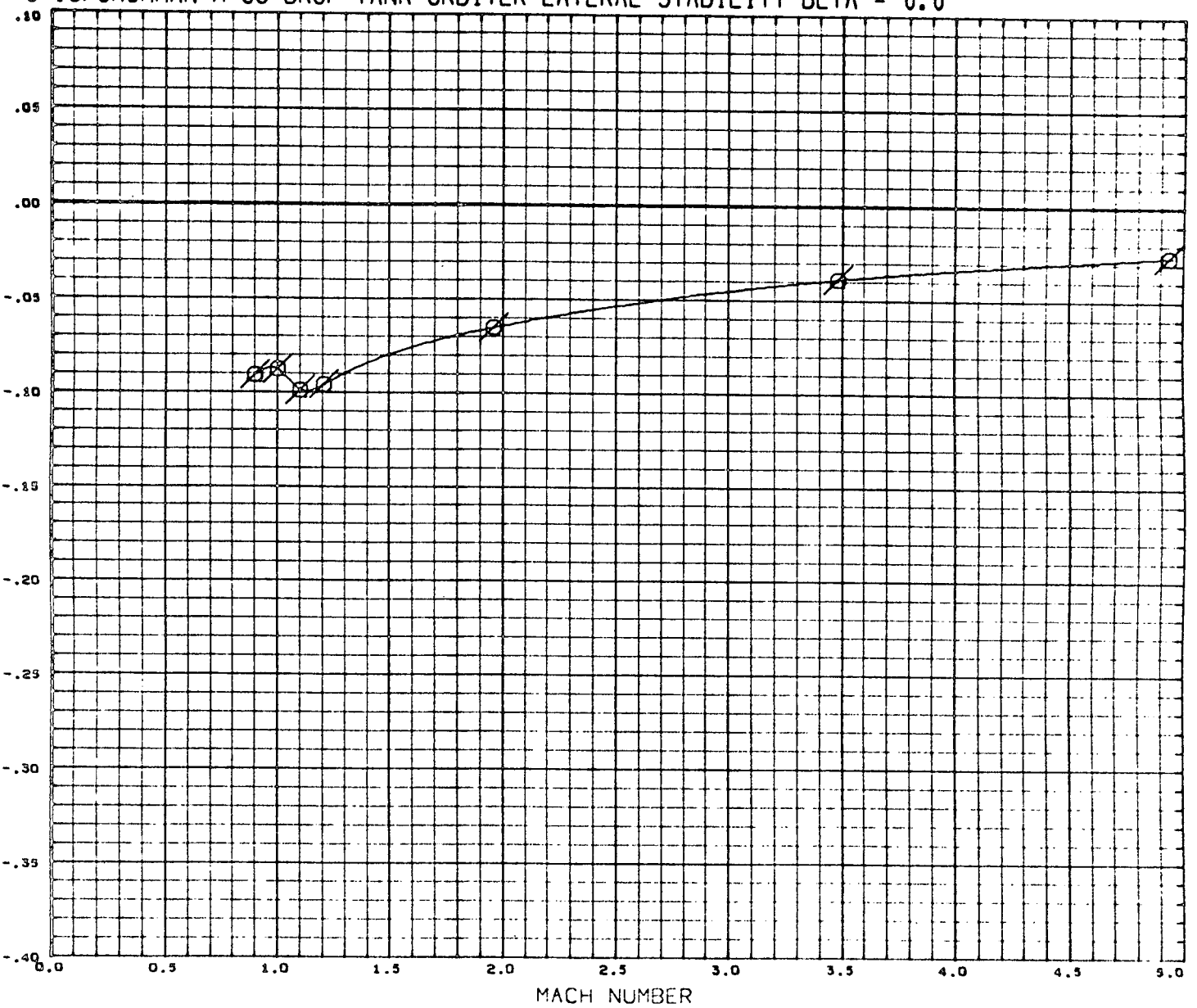
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

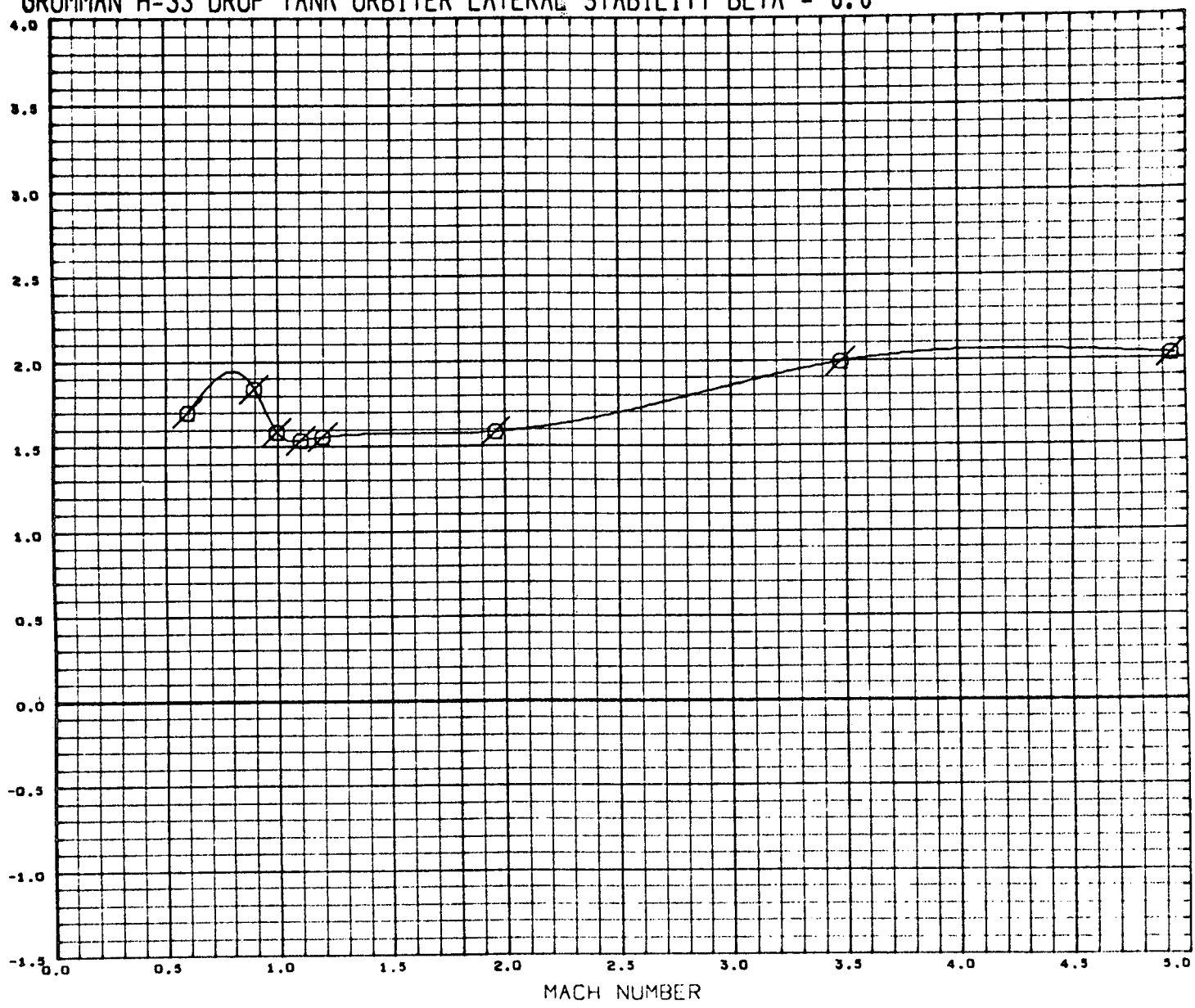
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

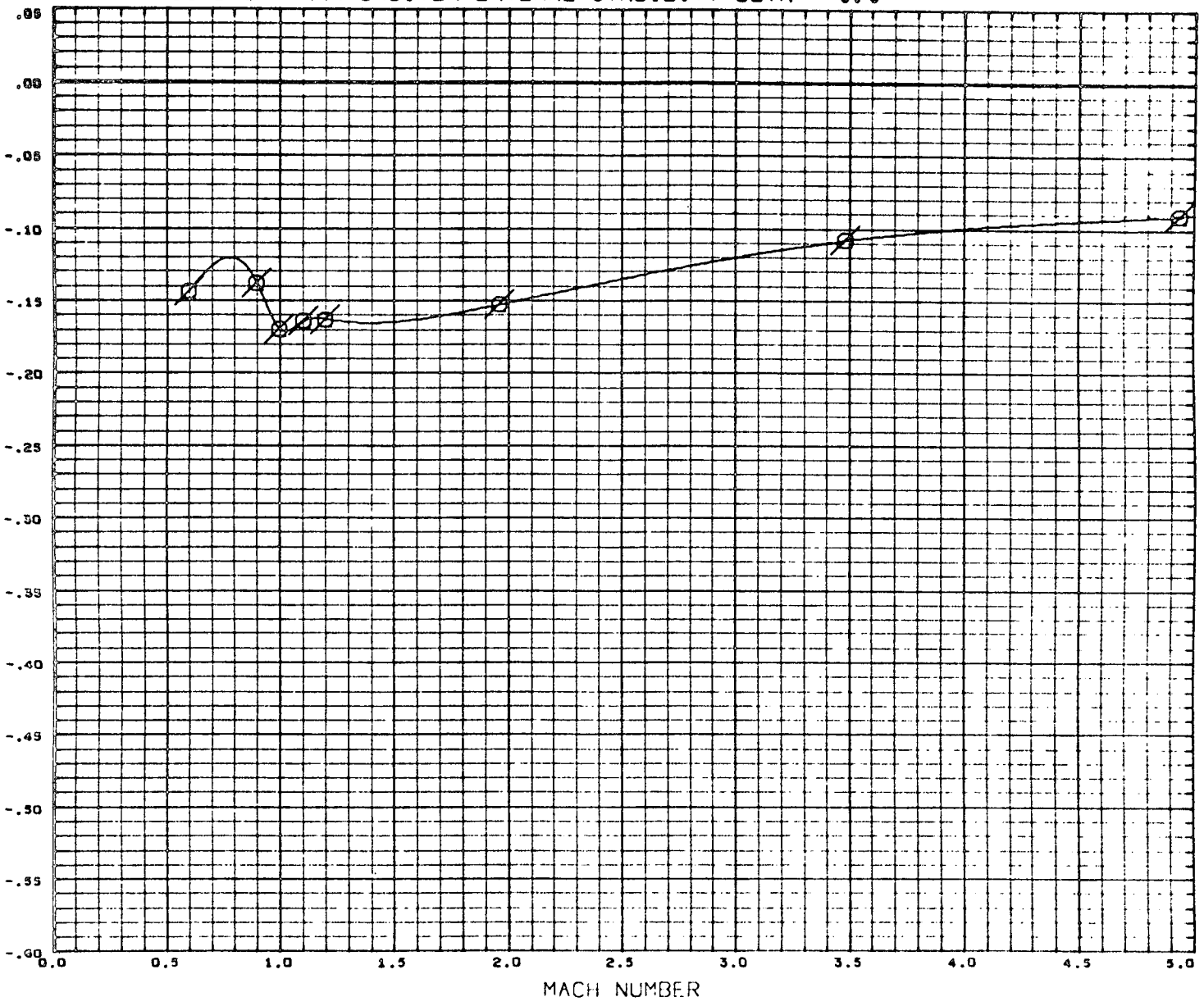
ALPHA 0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

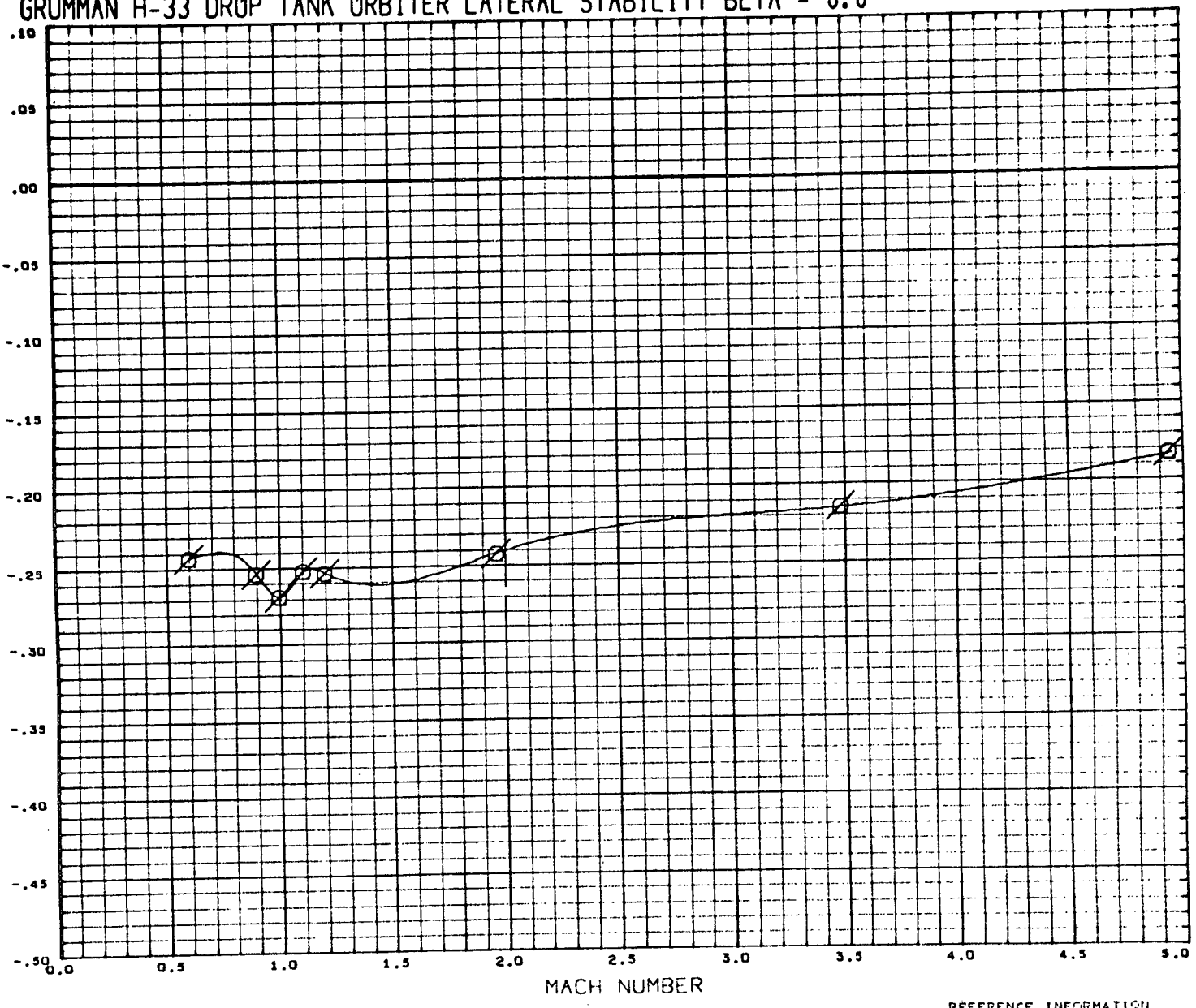
ALPHA 0.000

DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

ALPHA 0.000

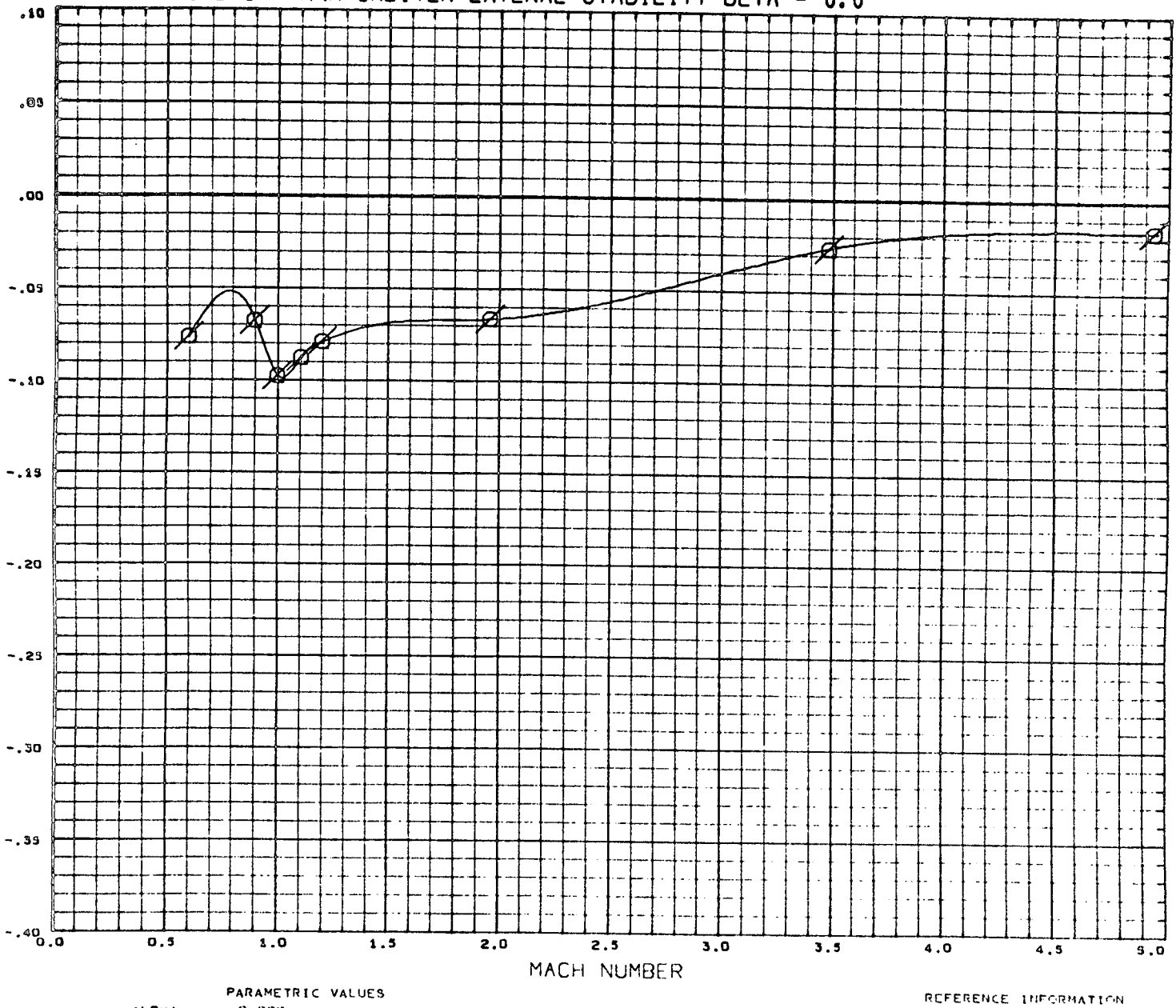
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

M502-MSFC-H-33 ORBITER PLUS CRADLE OWVTC (D44115) 12 MAY 72 PAGE 345

GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES

ALPHA 0.000

DATA HIST. CODE CCCGCF

REFERENCE INFORMATION

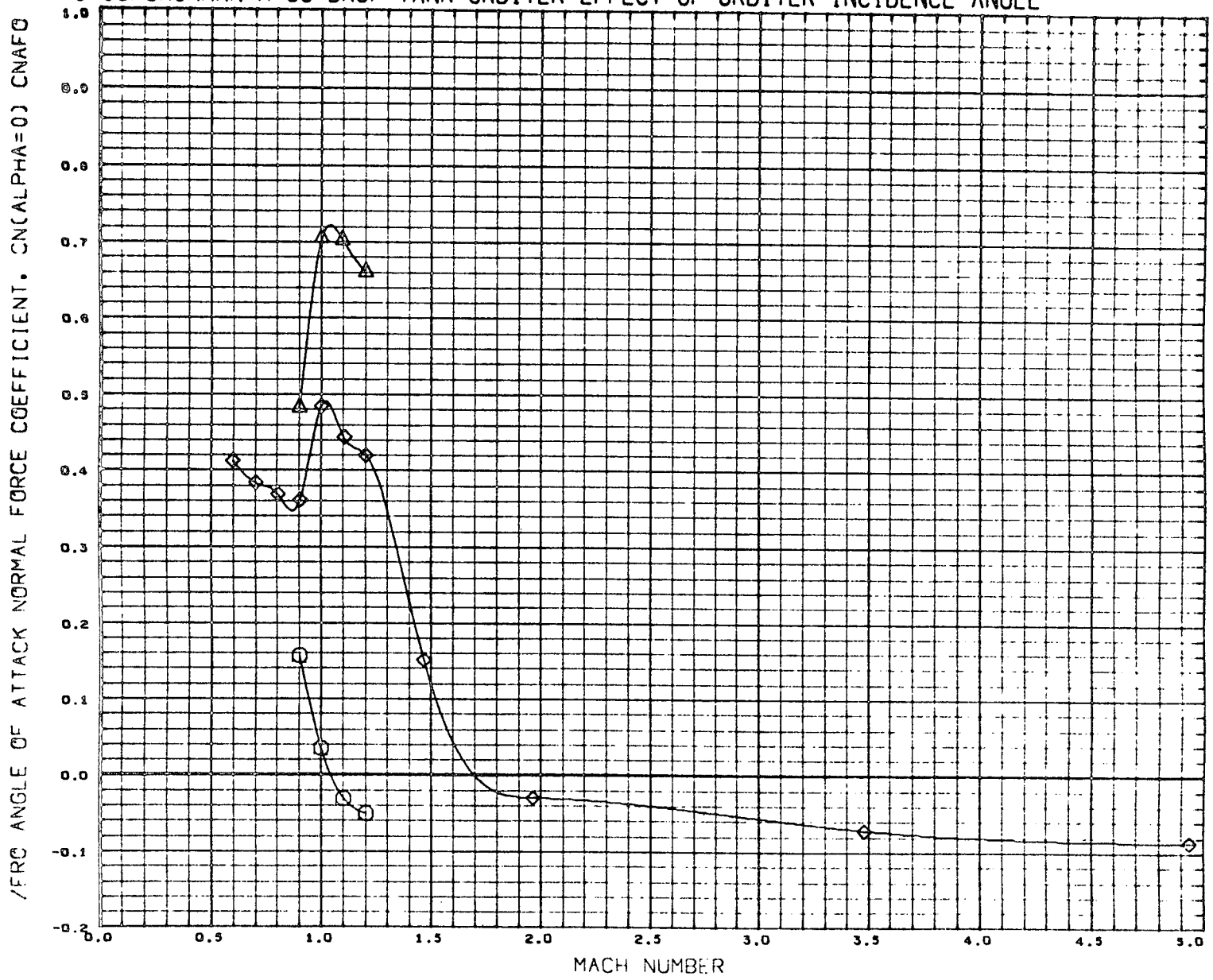
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE ANGLE

SYMBOL	WNGINC	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
○	- 2.000	BETA	0.000	PHI 0.000	DATASET		DATASET		SREF	1.3960 SQ.IN.
△	1.240				D44031 -	2.000	D44011	1.240	LREF	1.3330 IN.
◇	0.000				D44041	0.000			BREF	1.3330 IN.
									XMRP	5.3990 IN.
									YMRP	0.0000 IN.
									ZMRP	0.0000 IN.
									SCALE	0.0034

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE ANGLE



SYMBOL	WNGINC
△	2.000
◇	1.240
○	0.000

PARAMETRIC VALUES: BETA 0.000 PHI 0.000

DATA SOURCE

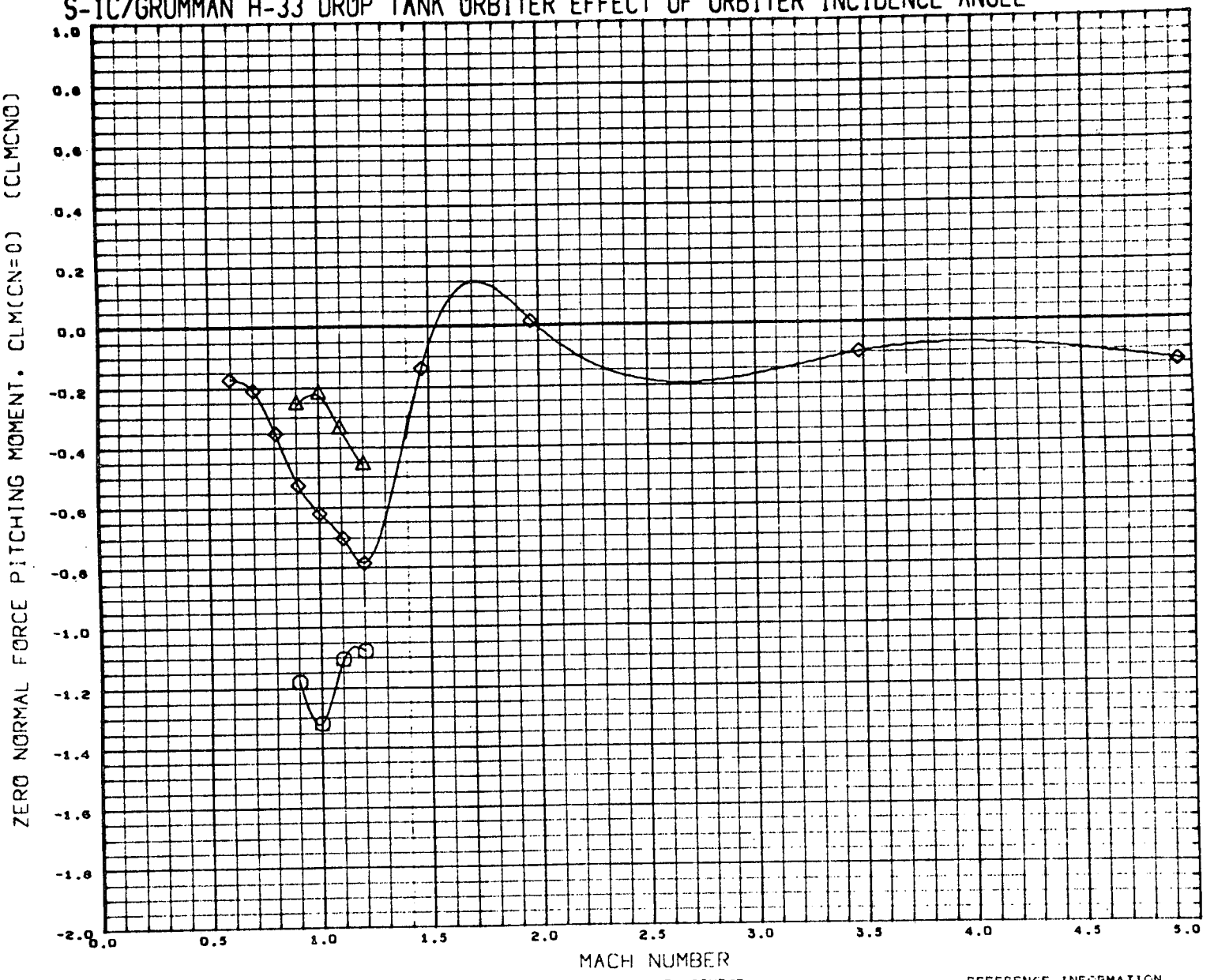
DATASET		DATASET	
D44031	2.000	D44011	1.240
D44041	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

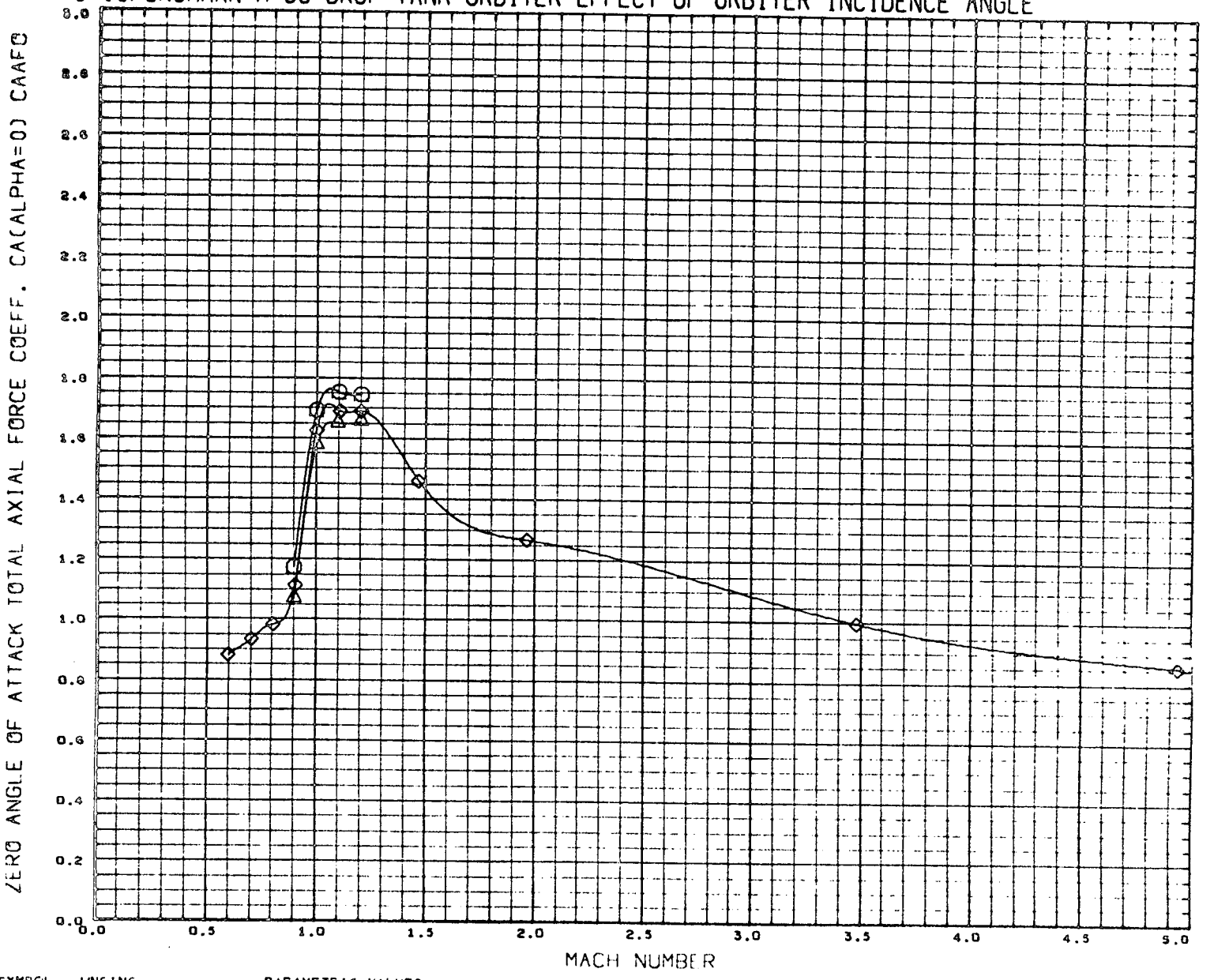
S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE ANGLE



SYMBOL	WNGINC	PARAMETRIC VALUES			DATA SOURCE				REFERENCE INFORMATION		
○	- 2.000	BETA	0.000	PHI 0.000	DATASET		DATASET		SREF	1.3960	SQ.IN.
△	1.240				D44031	- 2.000	D44011	1.240	LREF	1.3330	IN.
◇	0.000				D44041	0.000			BREF	1.3330	IN.
									XMRP	5.3990	IN.
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCGCF

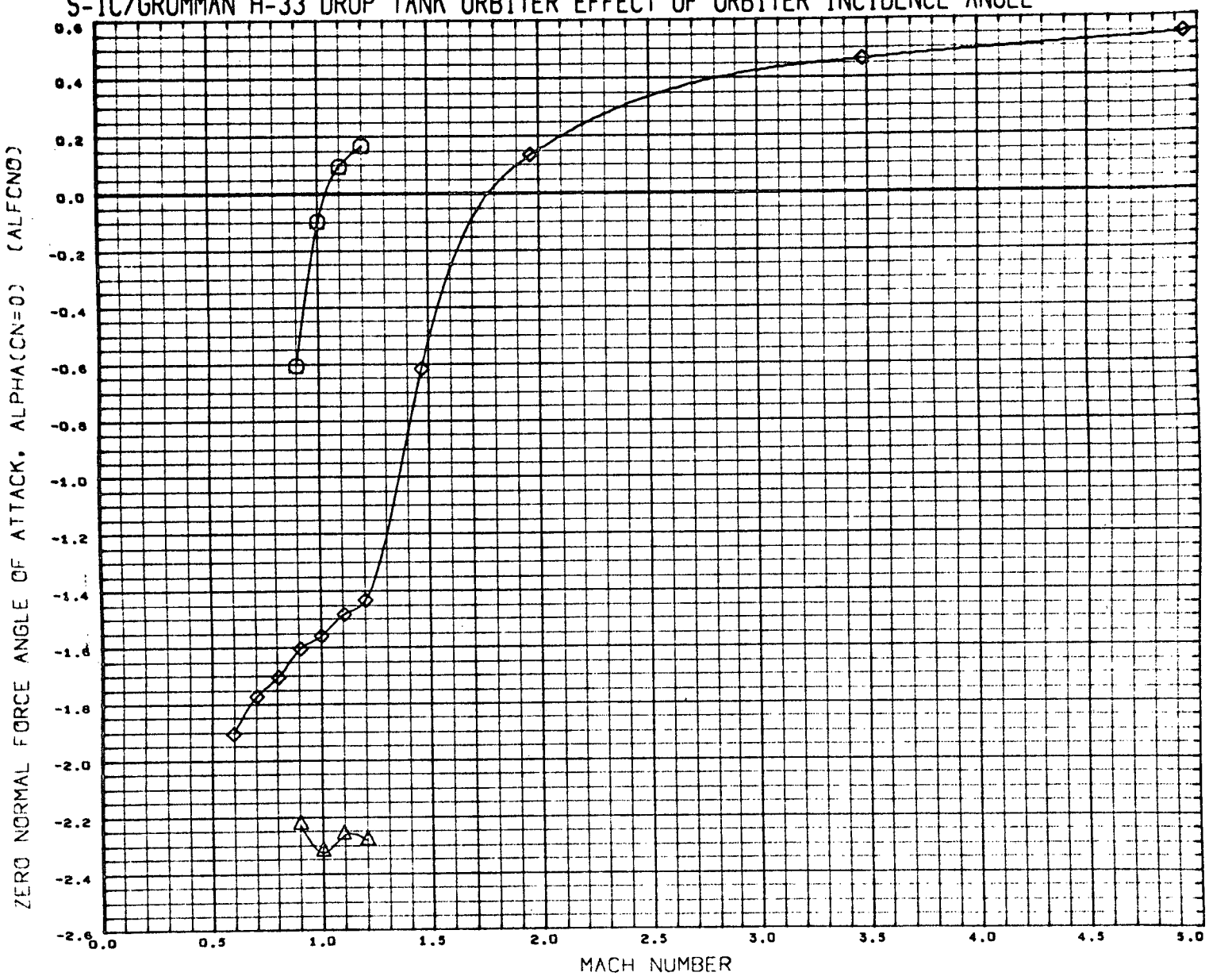
S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE ANGLE



SYMBOL	WNGINC	PARAMETRIC VALUES			DATA SOURCE				REFERENCE INFORMATION		
○	- 2.000	BETA	0.000	PHI 0.000	DATASET		DATASET		SREF	1.3960	SQ.IN.
△	1.240				D44031	- 2.000	D44011	1.240	LREF	1.3330	IN.
◇	0.000				D44041	0.000			BREF	1.3330	IN.
									XMRP	5.3990	IN.
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCCCF

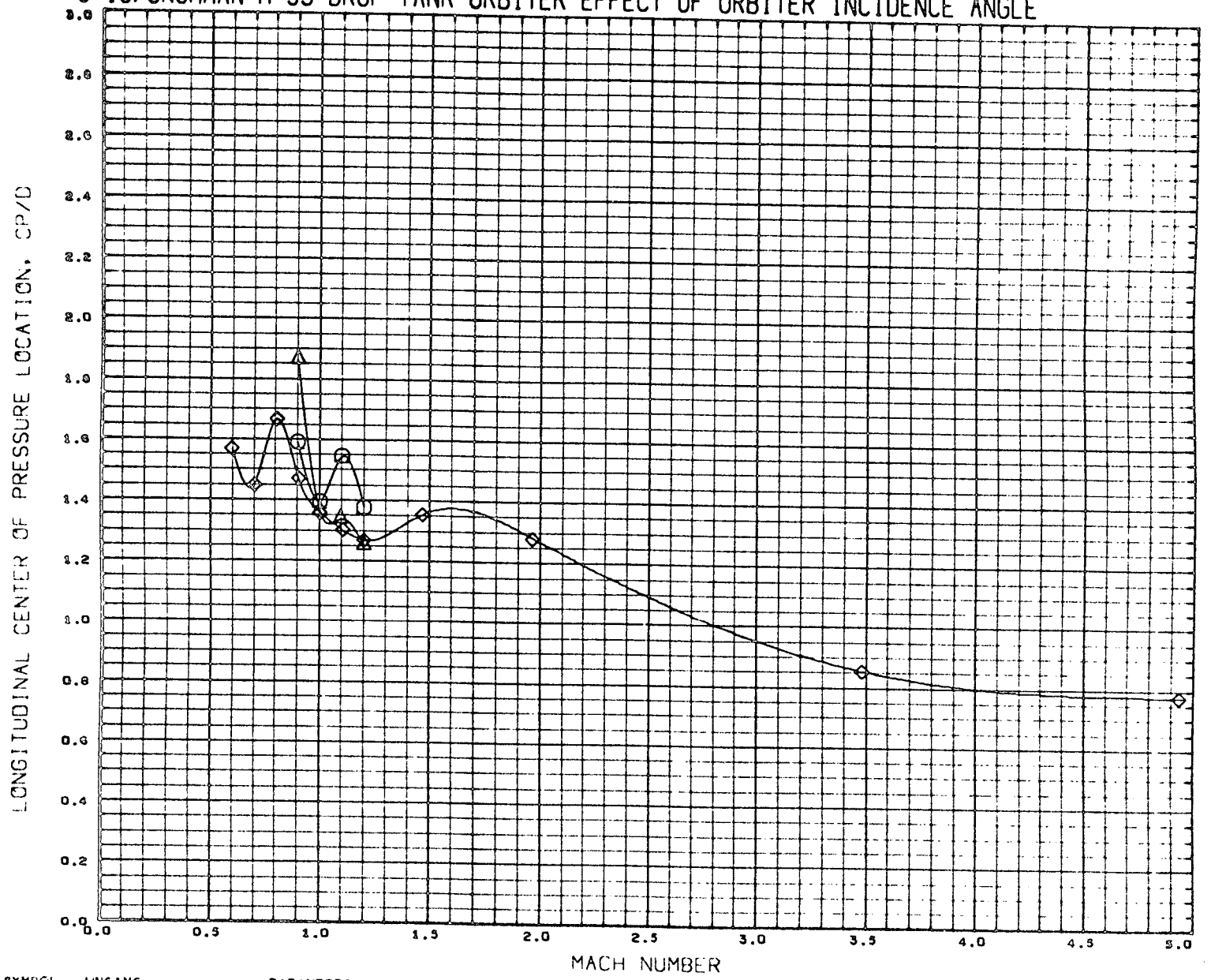
S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE ANGLE



SYMBOL	WNGINC	PARAMETRIC VALUES			DATA SOURCE				REFERENCE INFORMATION		
○	- 2.000	DELTA	0.000	PHI 0.000	DATASET		DATASET		SREF	1.3960	SQ.IN.
△	1.240				D44031	- 2.000	D44011	1.240	LREF	1.3330	IN.
◇	0.000				D44041	0.000			BREF	1.3330	IN.
									XMRP	5.3990	IN.
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCGCF

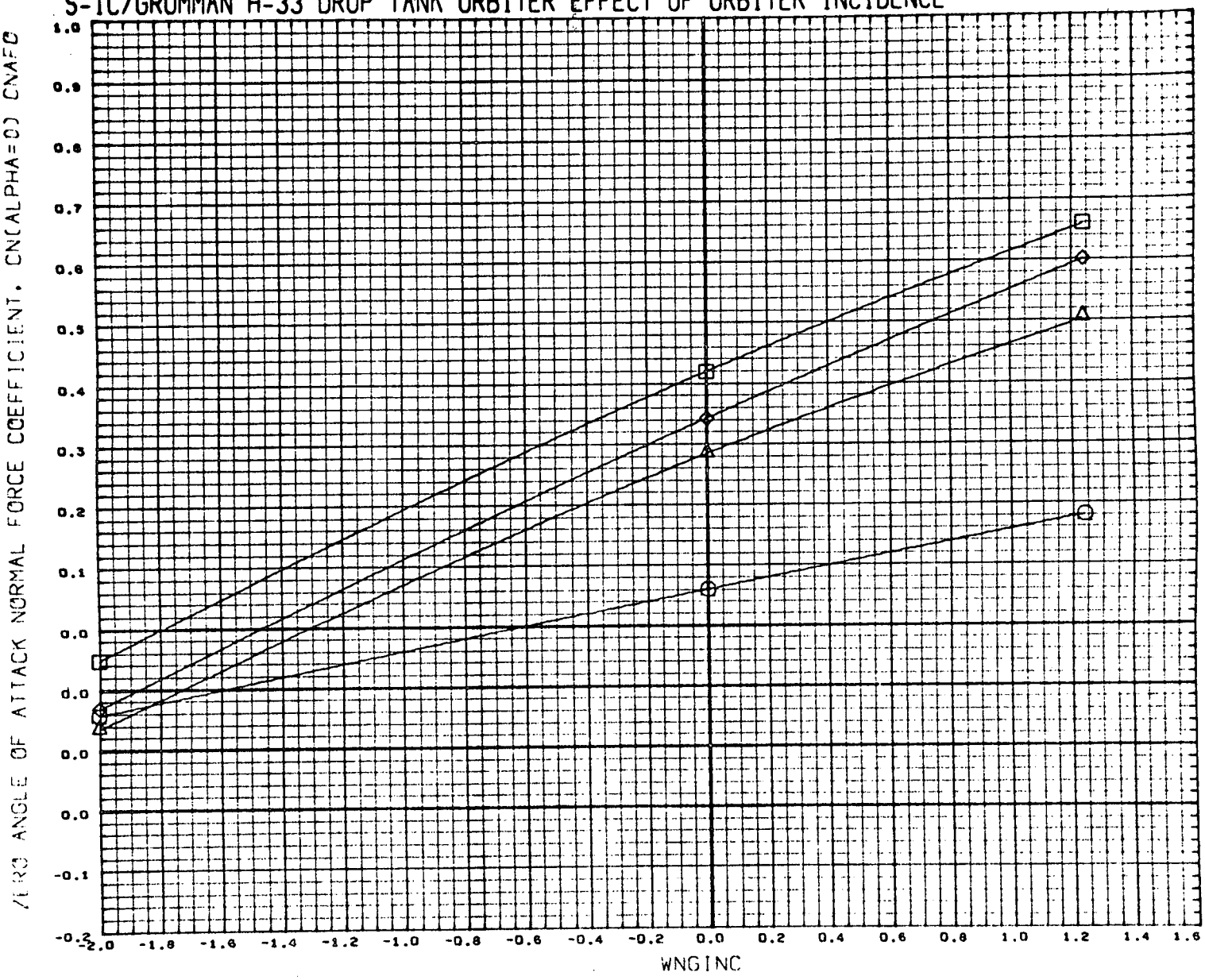
S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE ANGLE



SYMBOL	WNGINC	PARAMETRIC VALUES		DATA SOURCE				REFERENCE INFORMATION		
○	- 2.000	BETA 0.000	PHI 0.000	DATASET		DATASET		SREF	1.3960	SQ.IN.
△	1.240			D44031	- 2.000	D44011	1.240	LREF	1.3330	IN.
◇	0.000			D44041	0.000			BREF	1.3330	IN.
								XMRP	5.3990	IN.
								YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
								SCALE	0.0034	

DATA HIST. CODE CCCGCF

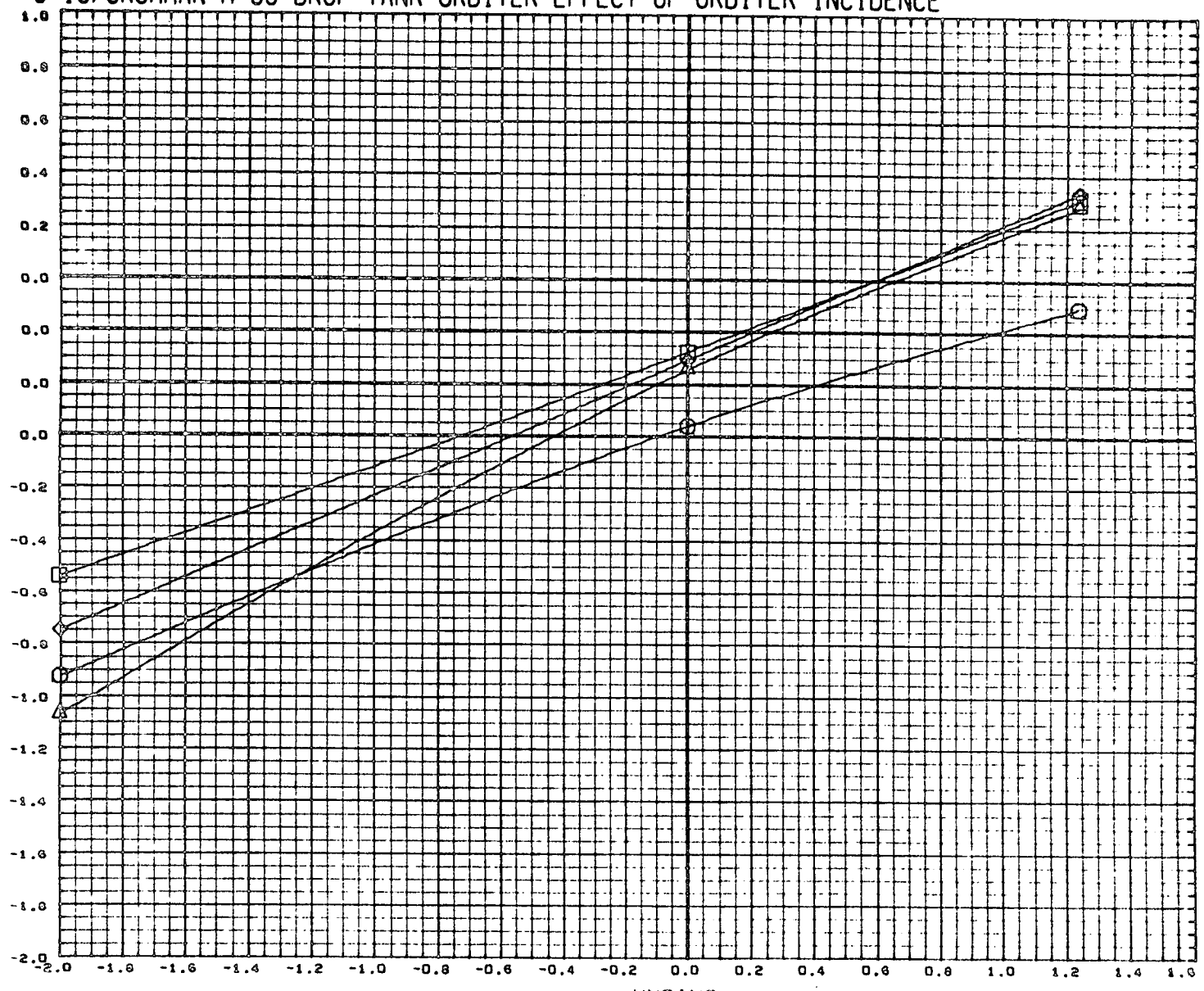
S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE



SYMBOL	MACH	PARAMETRIC VALUES			DATA SOURCE				REFERENCE INFORMATION		
	0.900	BETA	0.000	PHI 0.000	DATASET	WNGINC	DATASET	WNGINC	SREF	1.3960	SQ.IN.
△	1.001				D44031	- 2.000	F44041	0.000	LREF	1.3330	IN.
◇	1.102				D44011	1.240			BREF	1.3330	IN.
□	1.202								XMRP	5.3990	IN.
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE



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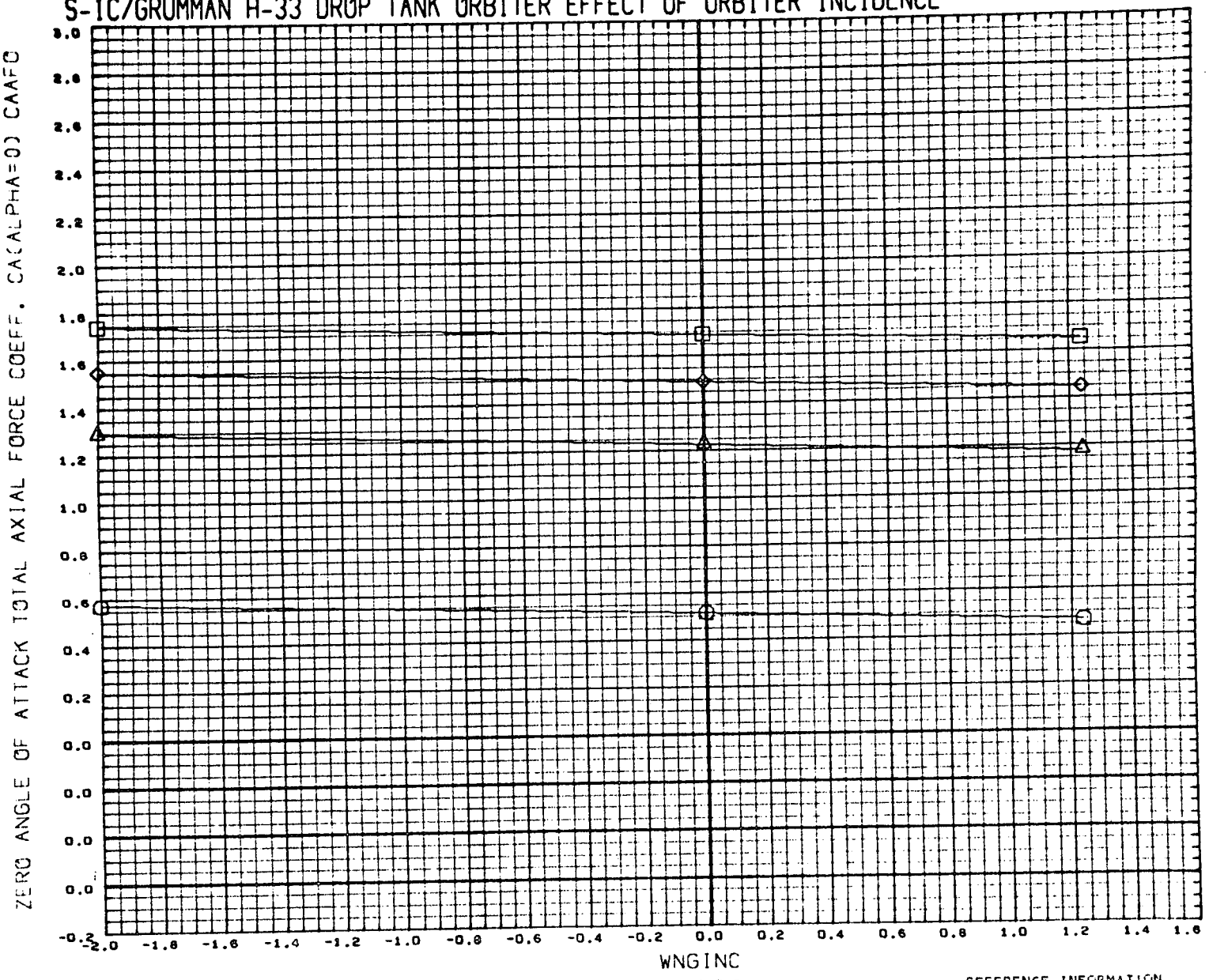
SYMBOL	MACH	PARAMETRIC VALUES			DATA SOURCE				REFERENCE INFORMATION		
	0.900	BETA	0.000	PHI 0.000	DATASET	WNGINC	DATASET	WNGINC	SREF	1.3960	SQ.IN.
◇	1.001				D44031	- 2.000	F44041	0.000	LREF	1.3330	IN.
	1.102				D44011	1.240			BREF	1.3330	IN.
	1.202								XMRP	5.3990	IN.
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE



SYMBOL	MACH
○	0.900
△	1.001
◇	1.102
□	1.202

PARAMETRIC VALUES: BETA 0.000 PHI 0.000

DATA SOURCE

DATASET	WNGINC	DATASET	WNGINC
D44031 -	2.000	F44041	0.000
D44011	1.240		

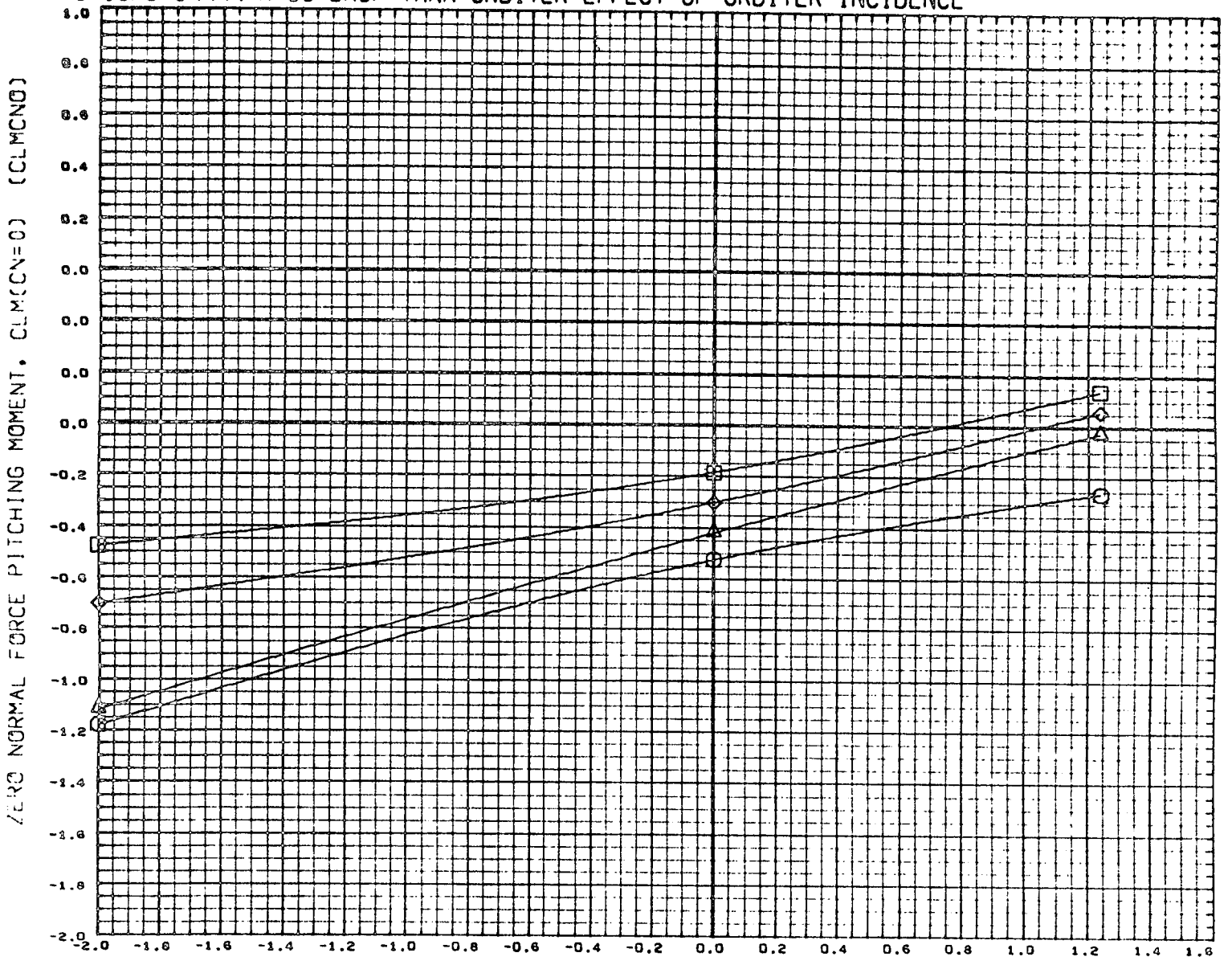
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3390	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

M502 MSFC-S1C H-33 ORBITER OWVTCBF (D44031) 12 MAY 72 PAGE 355

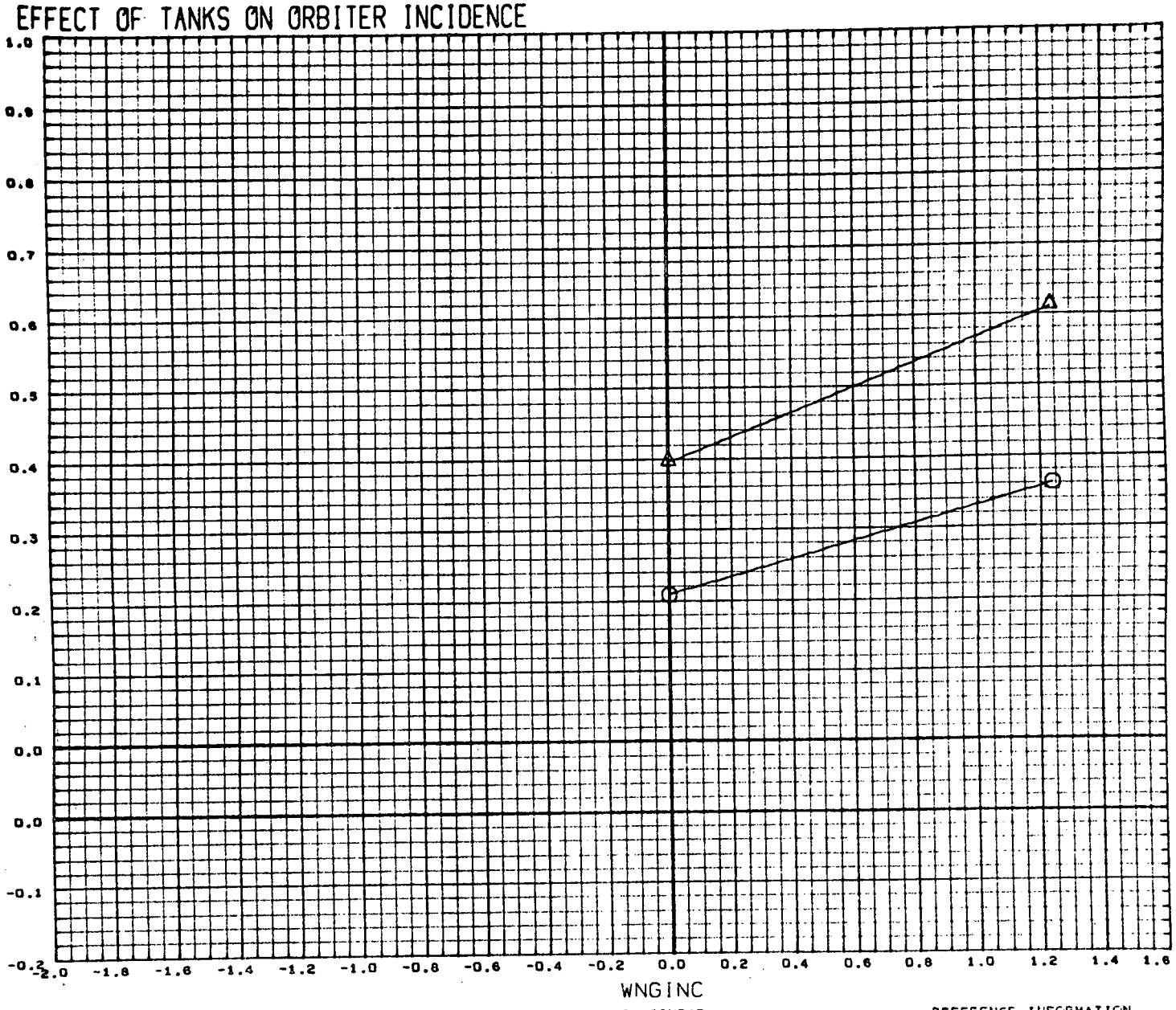
S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE



SYMBOL	MACH	PARAMETRIC VALUES			DATA SOURCE				REFERENCE INFORMATION		
	0.900	BETA	0.000	PHI 0.000	DATASET	WNGINC	DATASET	WNGINC	SREF	1.3960	SQ.IN.
	1.001				D44031	- 2.000	F44041	0.000	LREF	1.3330	IN.
	1.102				D44011	1.240			BREF	1.3330	IN.
	1.202								XMRP	5.3990	IN.
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCGCF

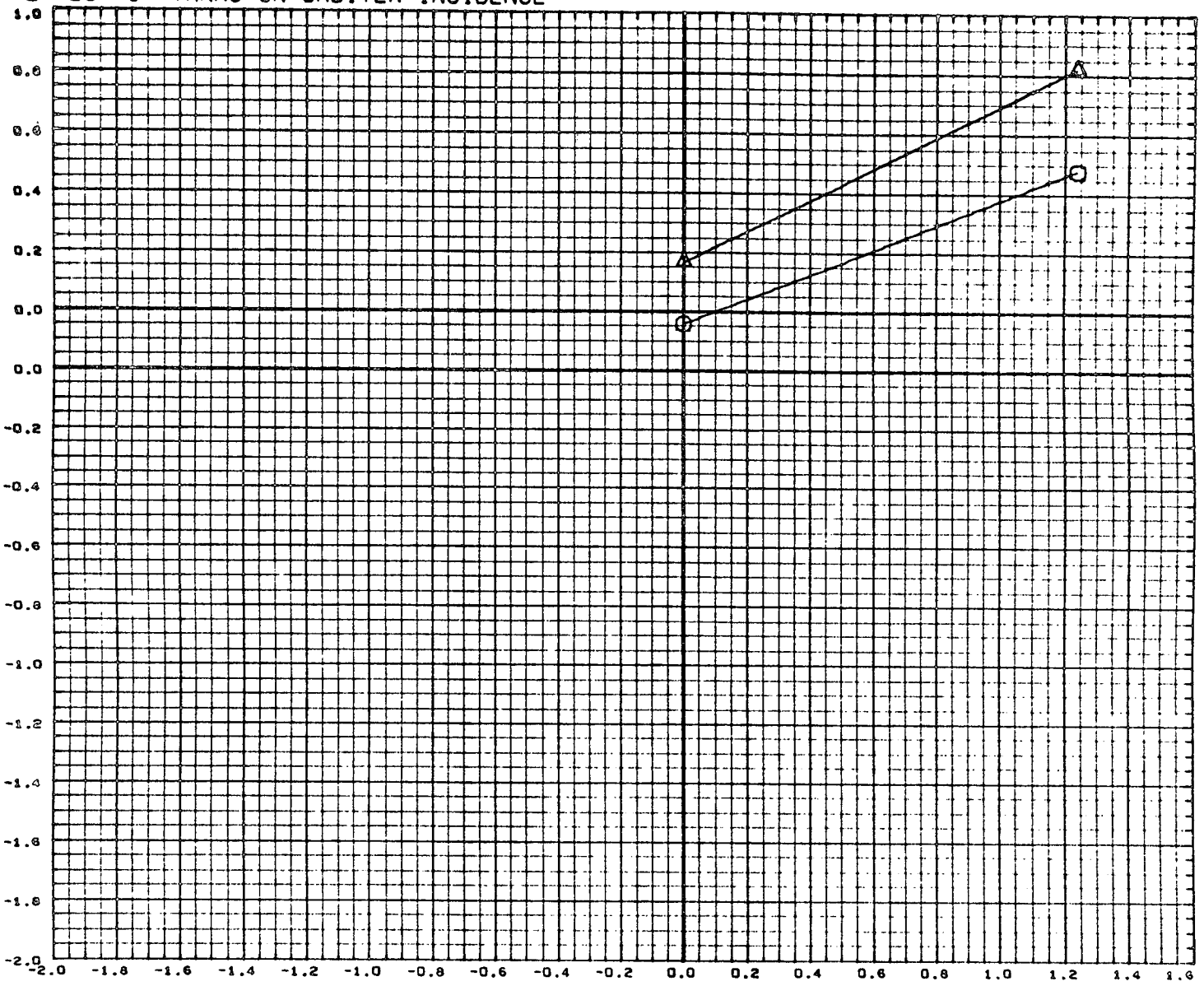
EFFECT OF TANKS ON ORBITER INCIDENCE



SYMBOL	MACH	PARAMETRIC VALUES			DATA SOURCE				REFERENCE INFORMATION		
○	0.903	BETA	0.000	PHI 0.000	DATASET	WNGINC	DATASET	WNGINC	SREF	1.3960	SQ.IN.
△	1.000				Z44051	0.000	D44021	1.240	LREF	1.3330	IN.
									BREF	1.3330	IN.
									XMRP	5.3990	IN.
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCGCF*AM

EFFECT OF TANKS ON ORBITER INCIDENCE

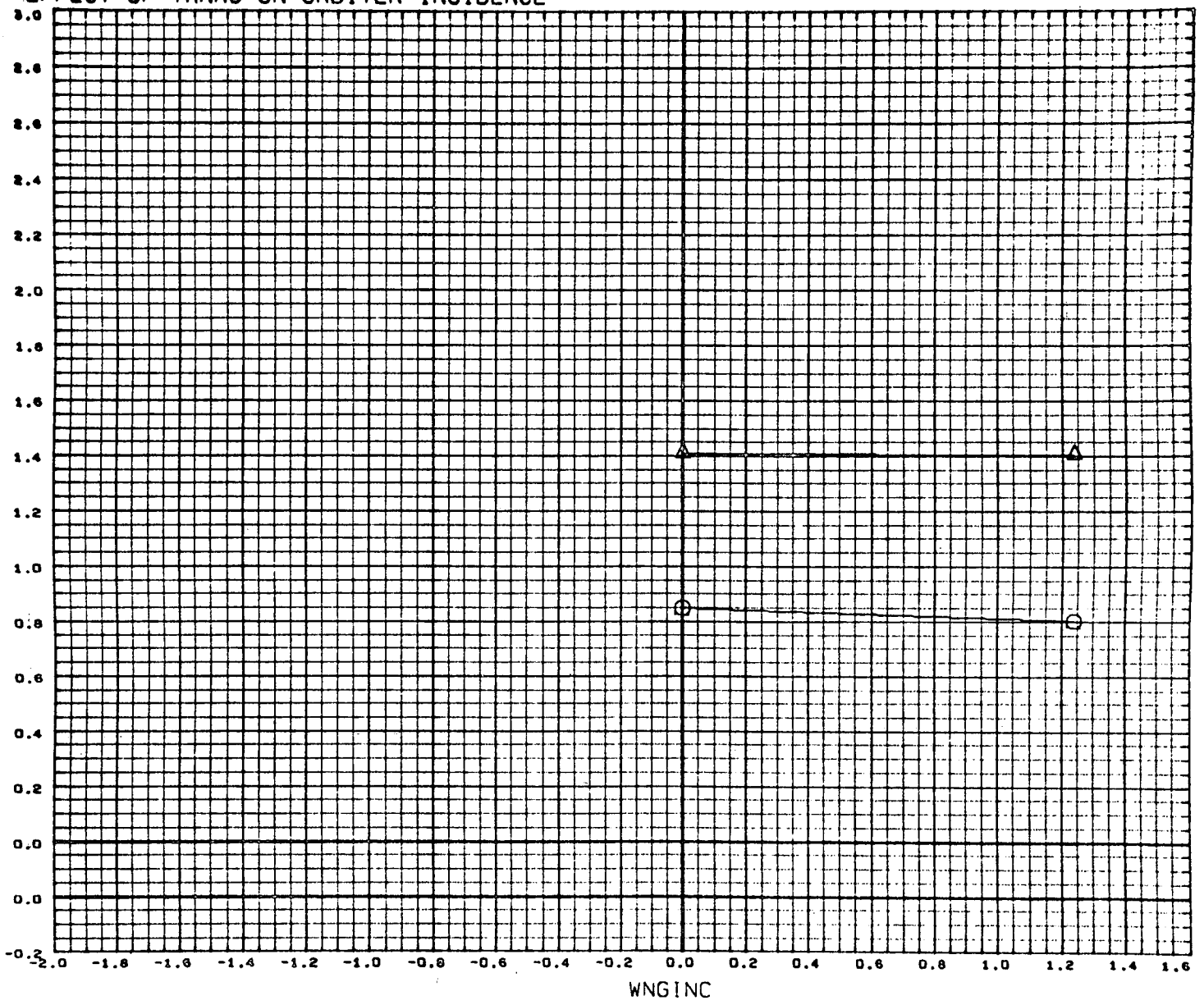


SYMBOL	MACH	PARAMETRIC VALUES			DATA SOURCE			
		DELTA	PHI		DATASET	WNGINC	DATASET	WNGINC
○	0.903	0.000	0.000		Z44051	0.000	D44021	1.240
△	1.000							

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF*AM

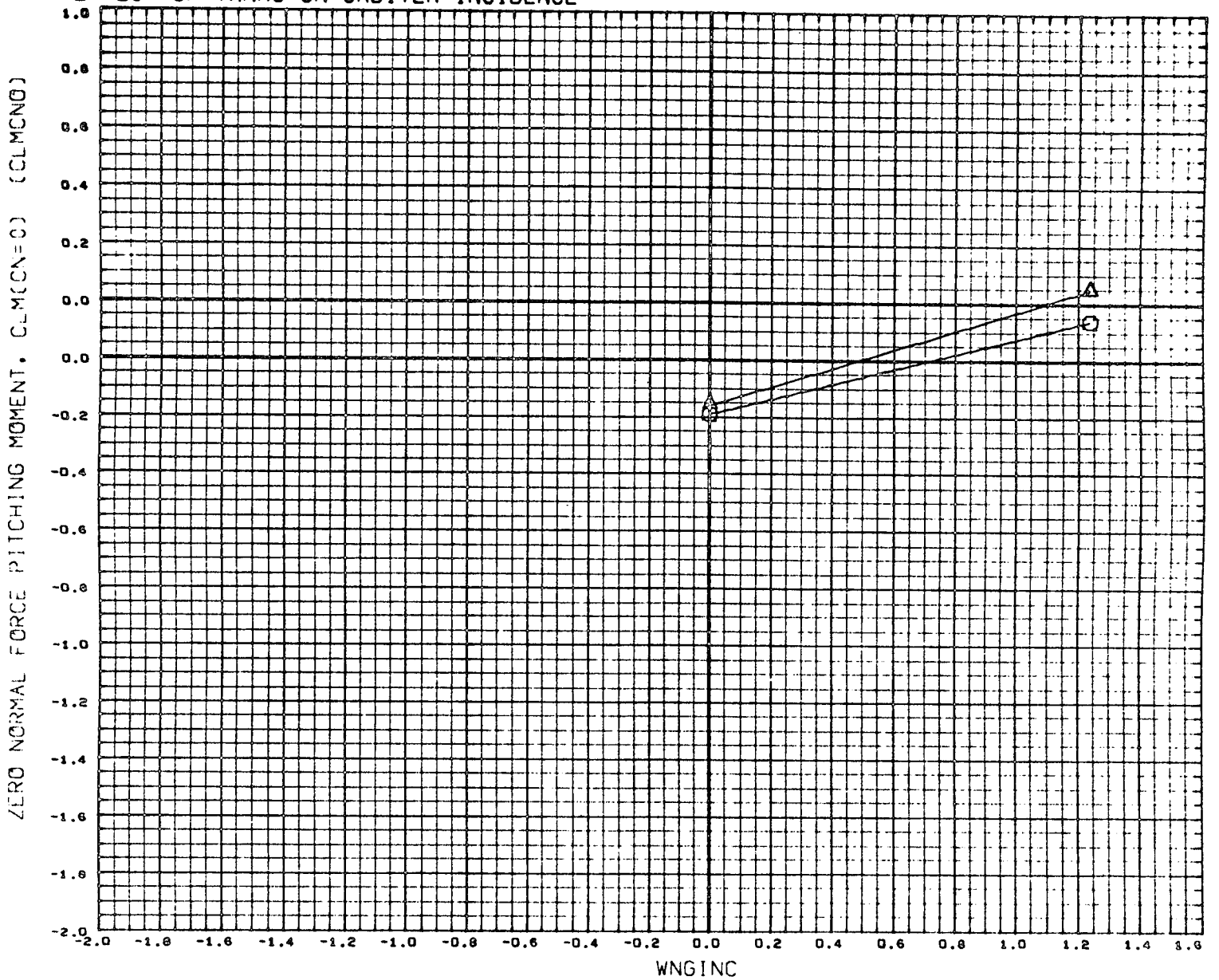
EFFECT OF TANKS ON ORBITER INCIDENCE



SYMBOL	MACH	PARAMETRIC VALUES		DATA SOURCE				REFERENCE INFORMATION		
○	0.903	BETA 0.000	PHI 0.000	DATASET	WNGINC	DATASET	WNGINC	SREF	1.3960	SQ.IN.
△	1.000			Z44051	0.000	D44021	1.240	LREF	1.3330	IN.
								BREF	1.3330	IN.
								XMRP	5.3990	IN.
								YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
								SCALE	0.0034	

DATA HIST. CODE CCCGCF*AM

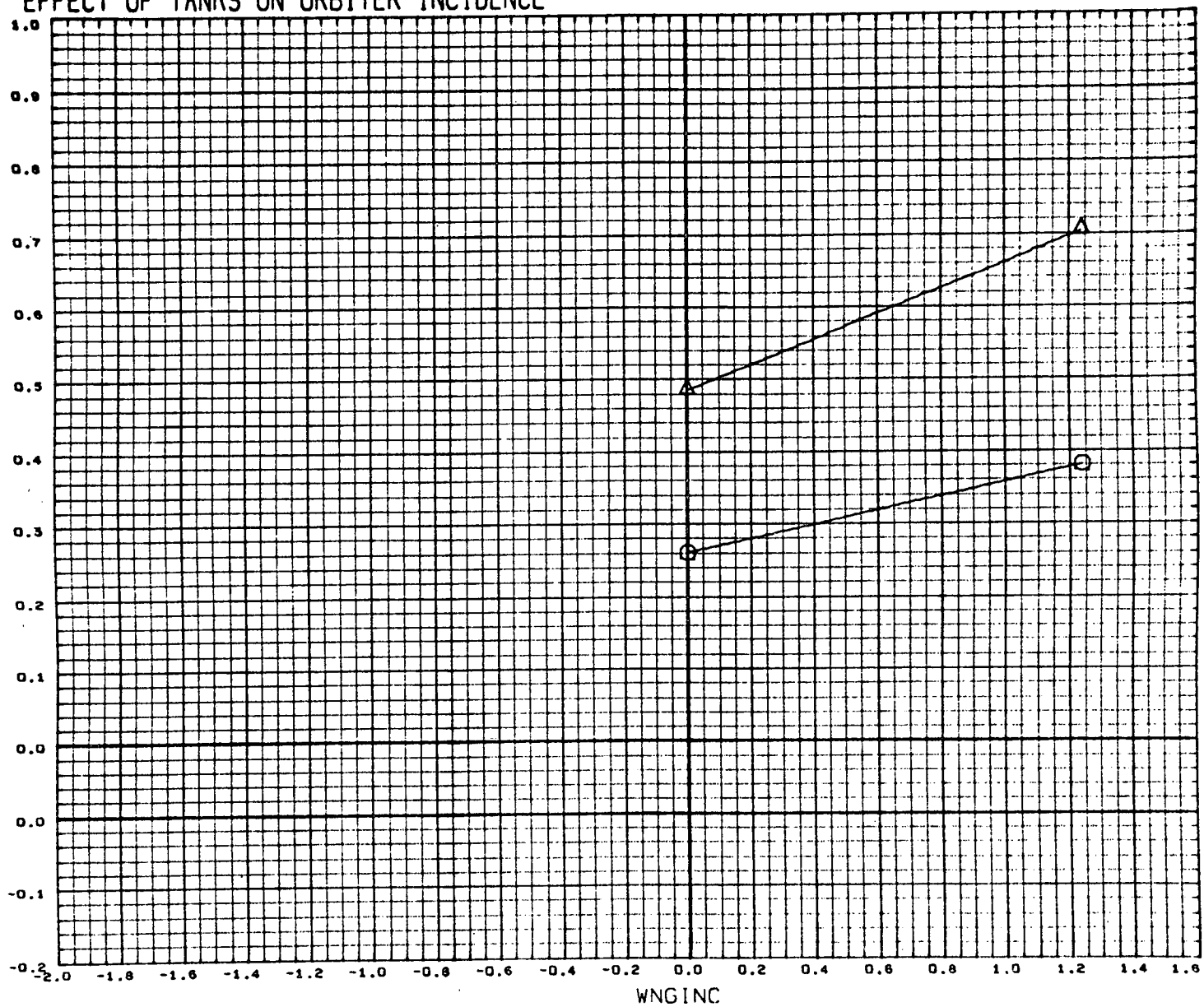
EFFECT OF TANKS ON ORBITER INCIDENCE



SYMBOL	MACH	PARAMETRIC VALUES		DATA SOURCE				REFERENCE INFORMATION		
	0.903	BETA 0.000	PHI 0.000	DATASET	WNGINC	DATASET	WNGINC	SREF	1.3960	SQ.IN.
△	1.000			Z44051	0.000	D44021	1.240	LREF	1.3330	IN.
								BREF	1.3330	IN.
								XMRP	5.3990	IN.
								YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
								SCALE	0.0034	

DATA HIST. CODE CCCGCF*AM

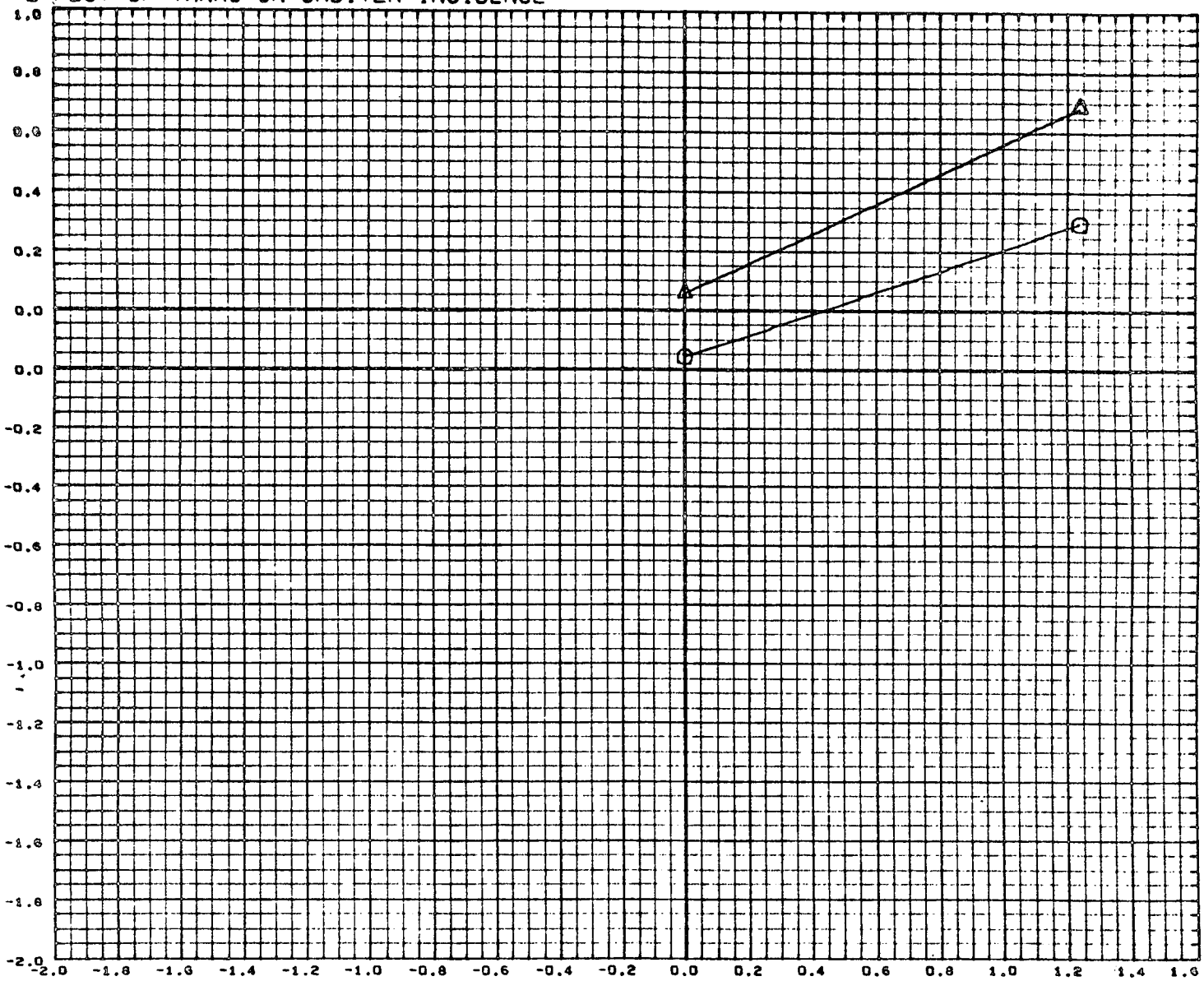
EFFECT OF TANKS ON ORBITER INCIDENCE



SYMBOL	MACH	PARAMETRIC VALUES			DATA SOURCE				REFERENCE INFORMATION		
○	0.904	BETA	0.000	PHI	0.000	DATASET	WNGINC	DATASET	WNGINC	SREF	1.3960	SQ.IN.
△	0.999					Q44041	0.000	Q44011	1.240	LREF	1.3330	IN.
										BREF	1.3330	IN.
										XMRP	5.3990	IN.
										YMRP	0.0000	IN.
										ZMRP	0.0000	IN.
										SCALE	0.0034	

DATA HIST. CODE CCCGCF#A

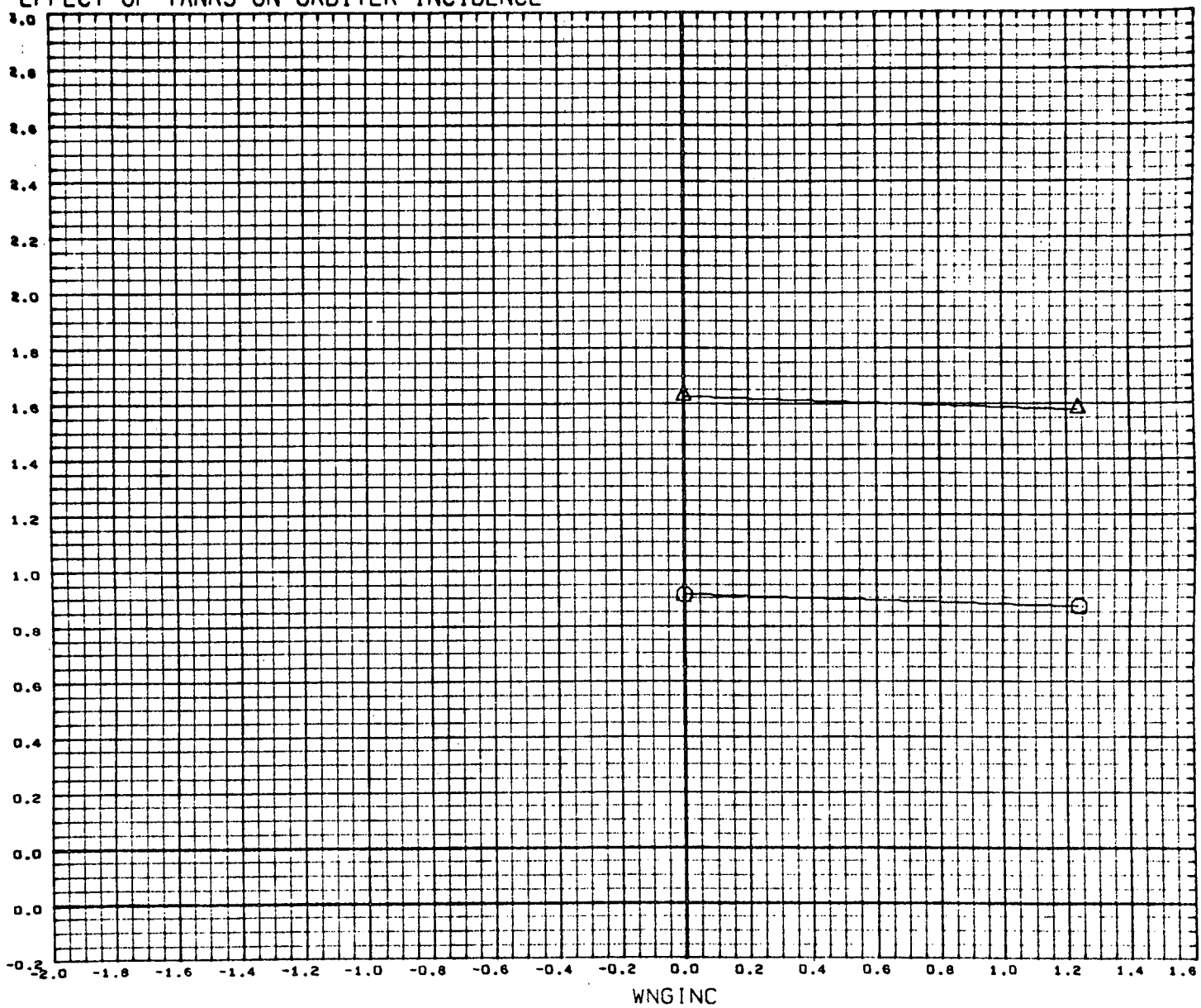
EFFECT OF TANKS ON ORBITER INCIDENCE



SYMBOL	MACH	PARAMETRIC VALUES		DATA SOURCE				REFERENCE INFORMATION		
	0.904	BETA 0.000	PHI 0.000	DATASET	WNGINC	DATASET	WNGINC	SREF	1.3960	SQ.IN.
△	0.999			Q44041	0.000	Q44011	1.240	LREF	1.3330	IN.
								BREF	1.3330	IN.
								XMRP	5.3990	IN.
								YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
								SCALE	0.0034	

DATA HIST. CODE CCCGCF*A

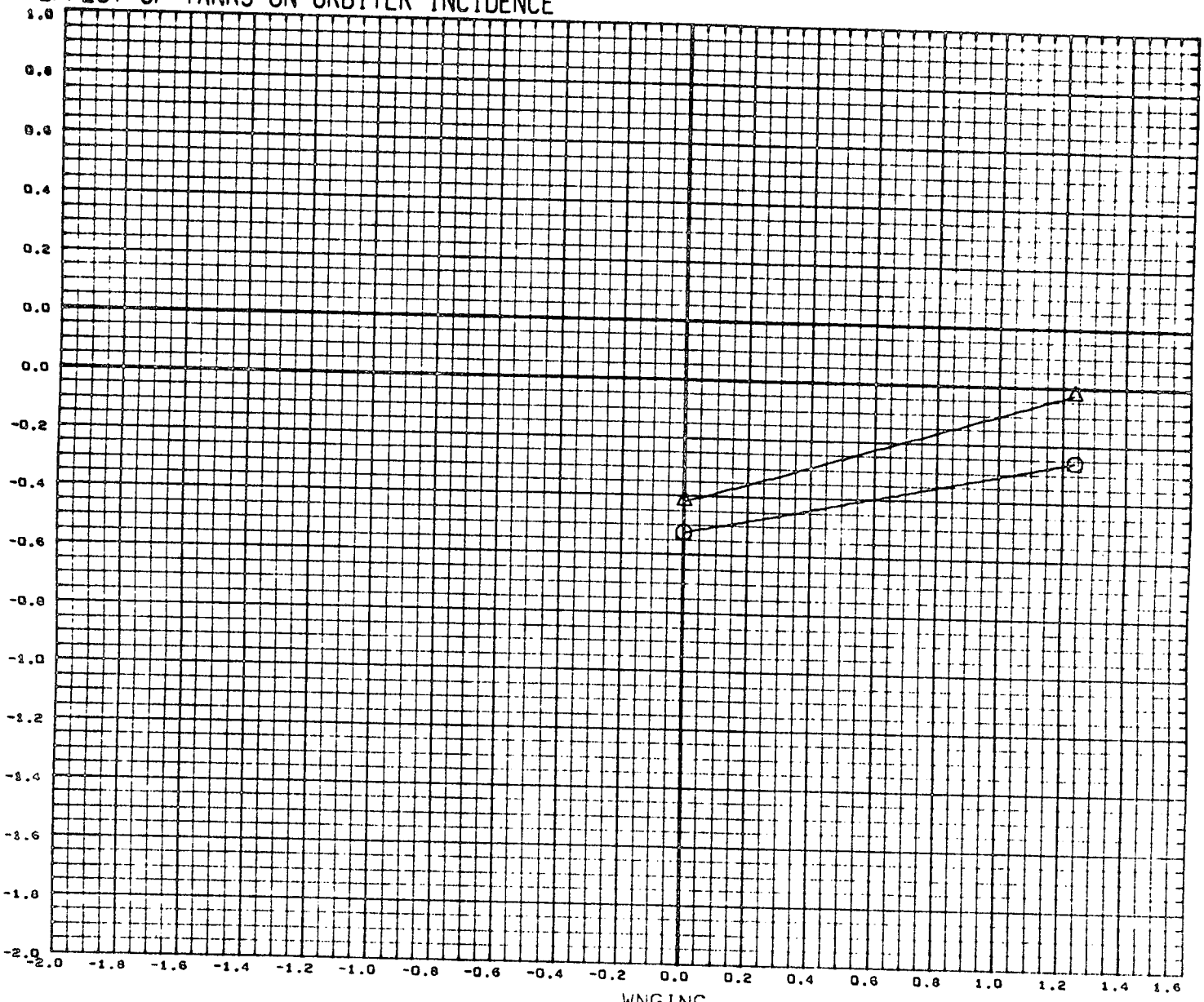
EFFECT OF TANKS ON ORBITER INCIDENCE



SYMBOL	MACH	PARAMETRIC VALUES			DATA SOURCE				REFERENCE INFORMATION		
○	0.904	BETA	0.000	PHI 0.000	DATASET	WNGINC	DATASET	WNGINC	SREF	1.3960	SQ.IN.
△	0.999				Q44041	0.000	Q44011	1.240	LREF	1.3330	IN.
									BREF	1.3330	IN.
									XMRP	5.3990	IN.
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCGCF*A

EFFECT OF TANKS ON ORBITER INCIDENCE



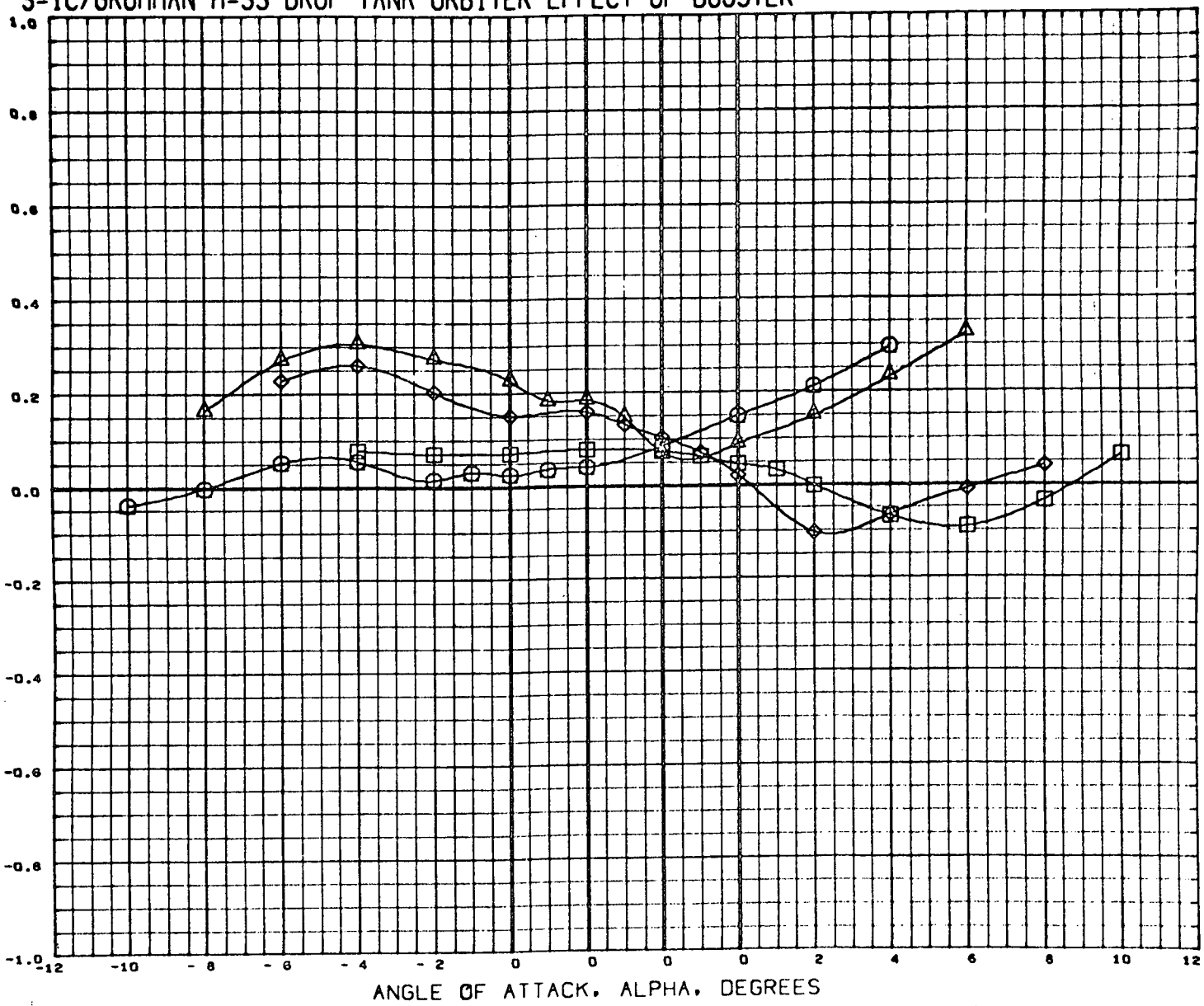
SYMBOL	MACH	PARAMETRIC VALUES			DATA SOURCE			
	0.904	BETA	0.000	PHI 0.000	DATASET	WNGINC	DATASET	WNGINC
△	0.999				044041	0.000	044011	1.240

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF*A

MS02 MSFC S1C H-33 ORBITER OWVTCBF (Q44041) 12 MAY 72 PAGE 364

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



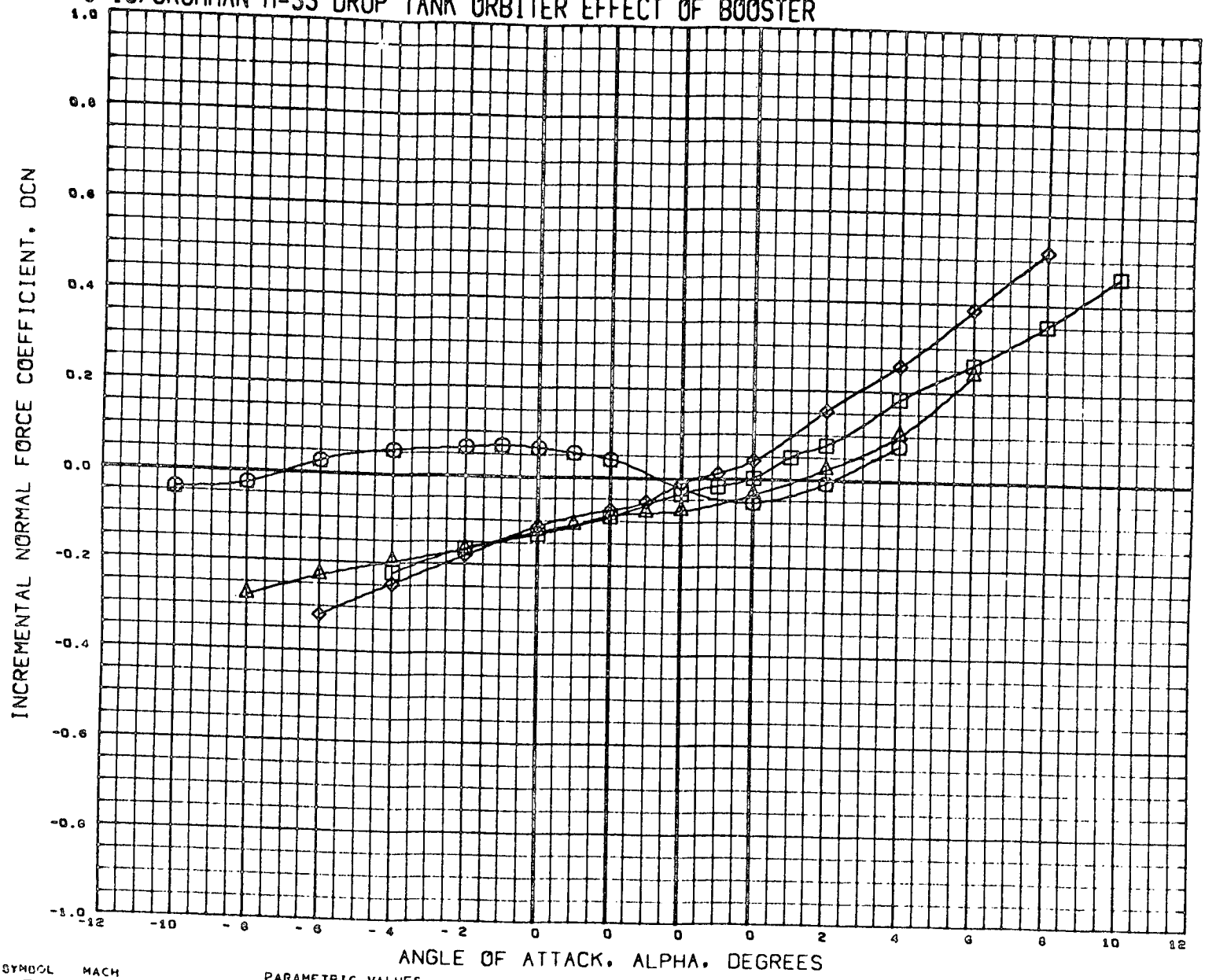
SYMBOL	MACH		PARAMETRIC VALUES
○	0.600	BETA	0.000
△	0.900		
◇	1.000		
□	1.100		

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



SYMBOL	MACH
○	1.200
△	1.960
◇	3.900
□	4.900

PARAMETRIC VALUES

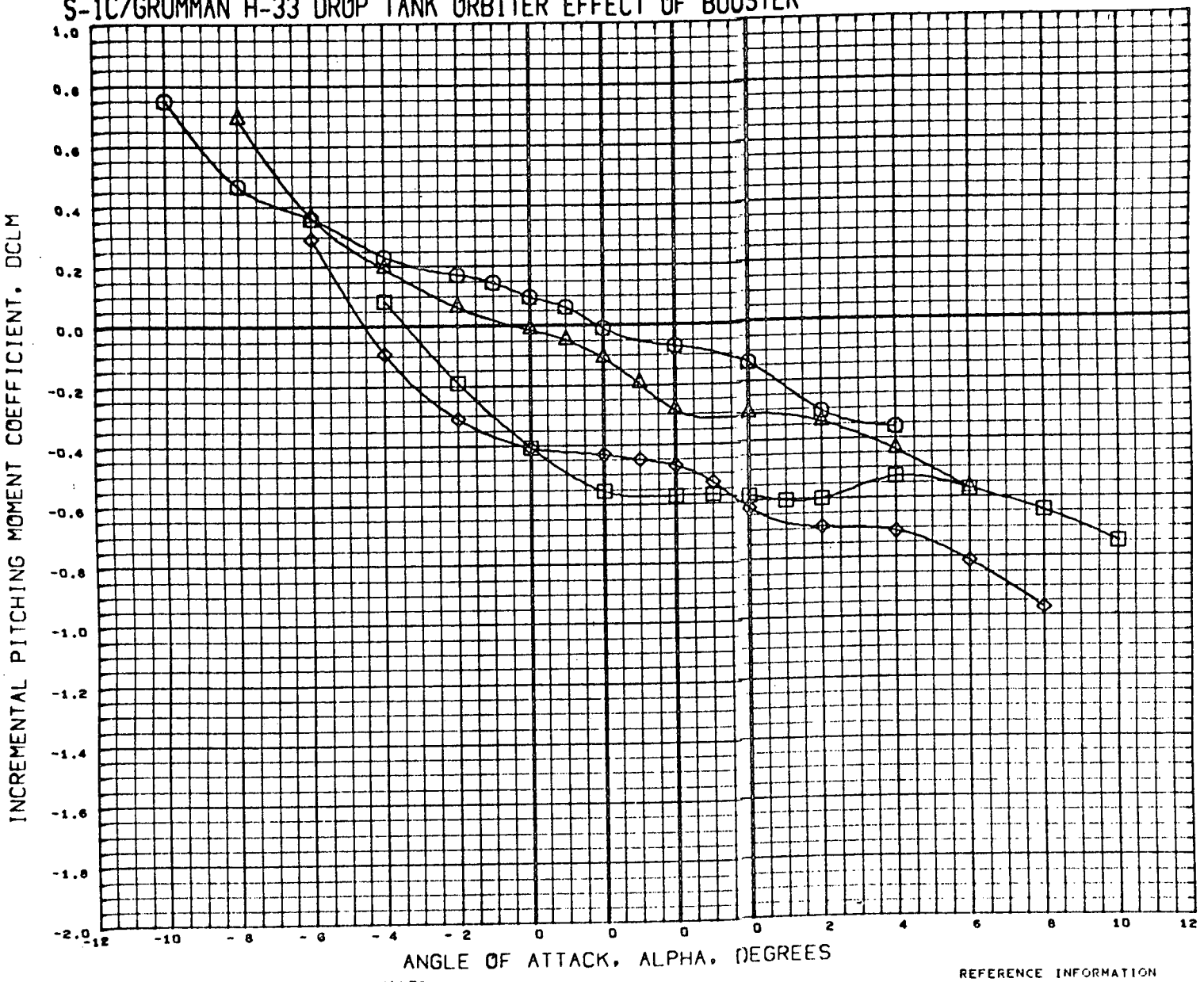
BETA 0.000

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



SYMBOL	MACH	PARAMETRIC VALUES	
○	0.600	BETA	0.000
△	0.900		
◇	1.000		
□	1.100		

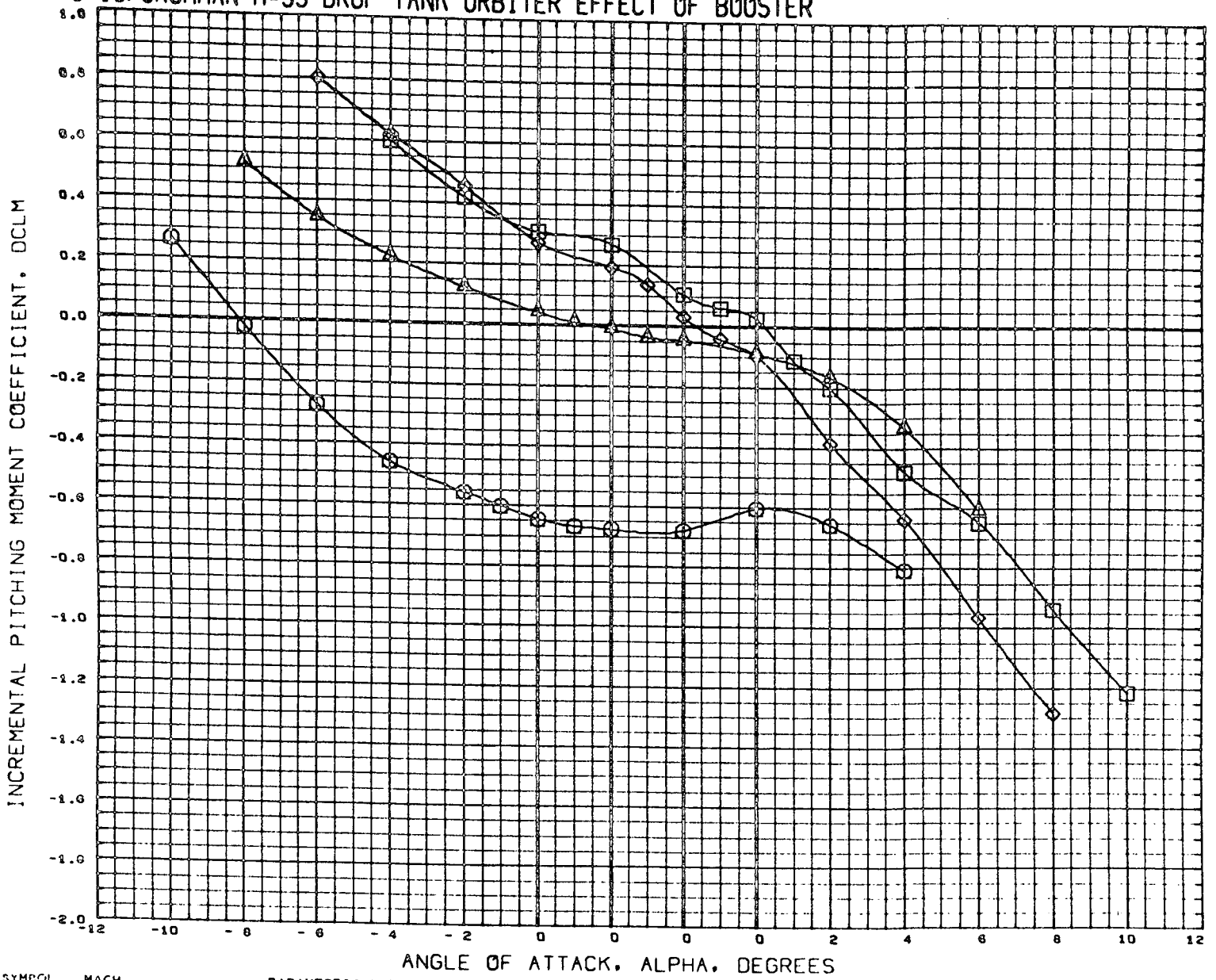
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI*A*C

M502-MSFC-S1C INCREMENTAL DATA(OWVTCBF-OWVTC) (J44041) 12 MAY 72 PAGE 367

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



SYMBOL	MACH
○	1.200
✕	1.960
◇	3.900
□	4.960

PARAMETRIC VALUES

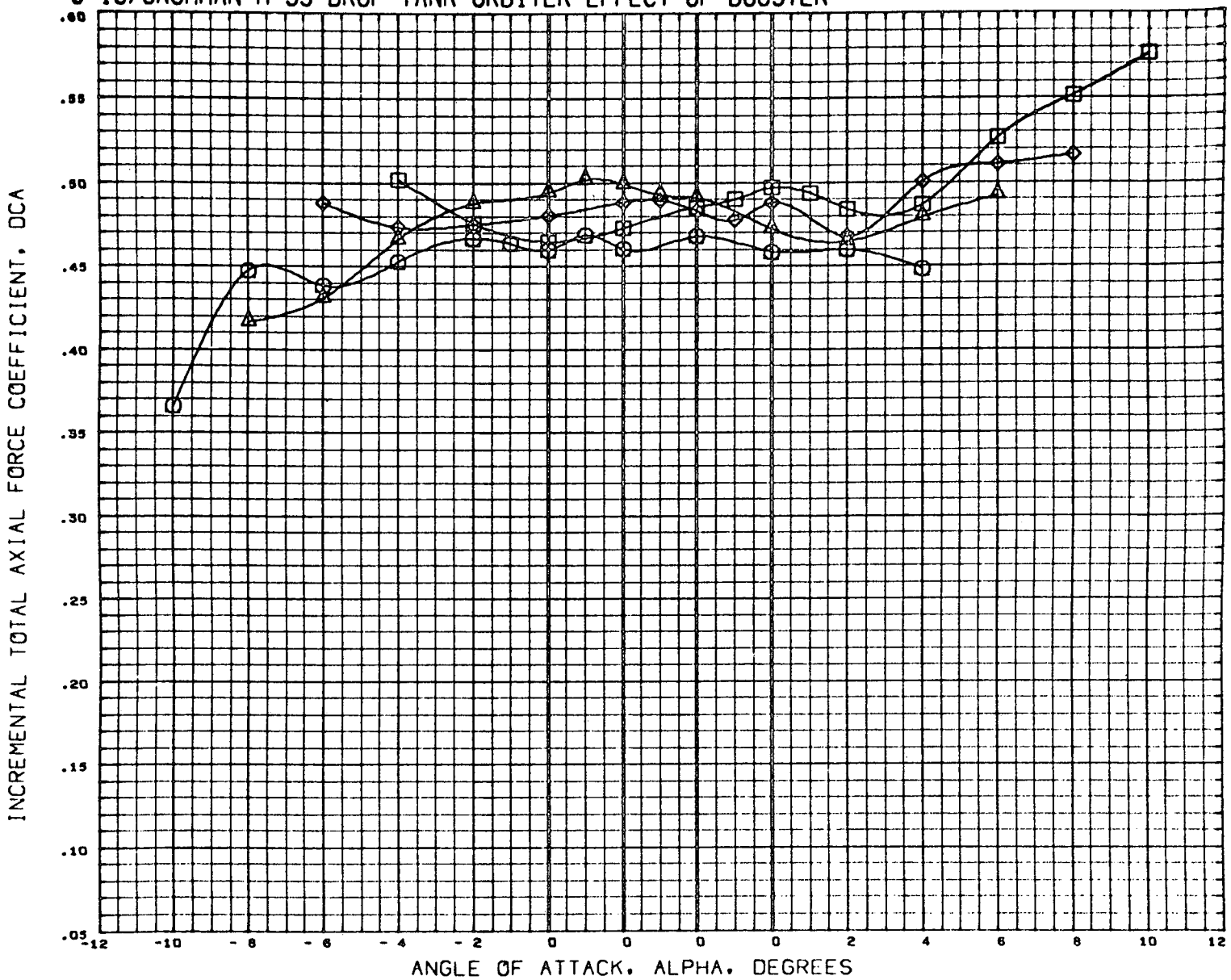
BETA 0.000

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



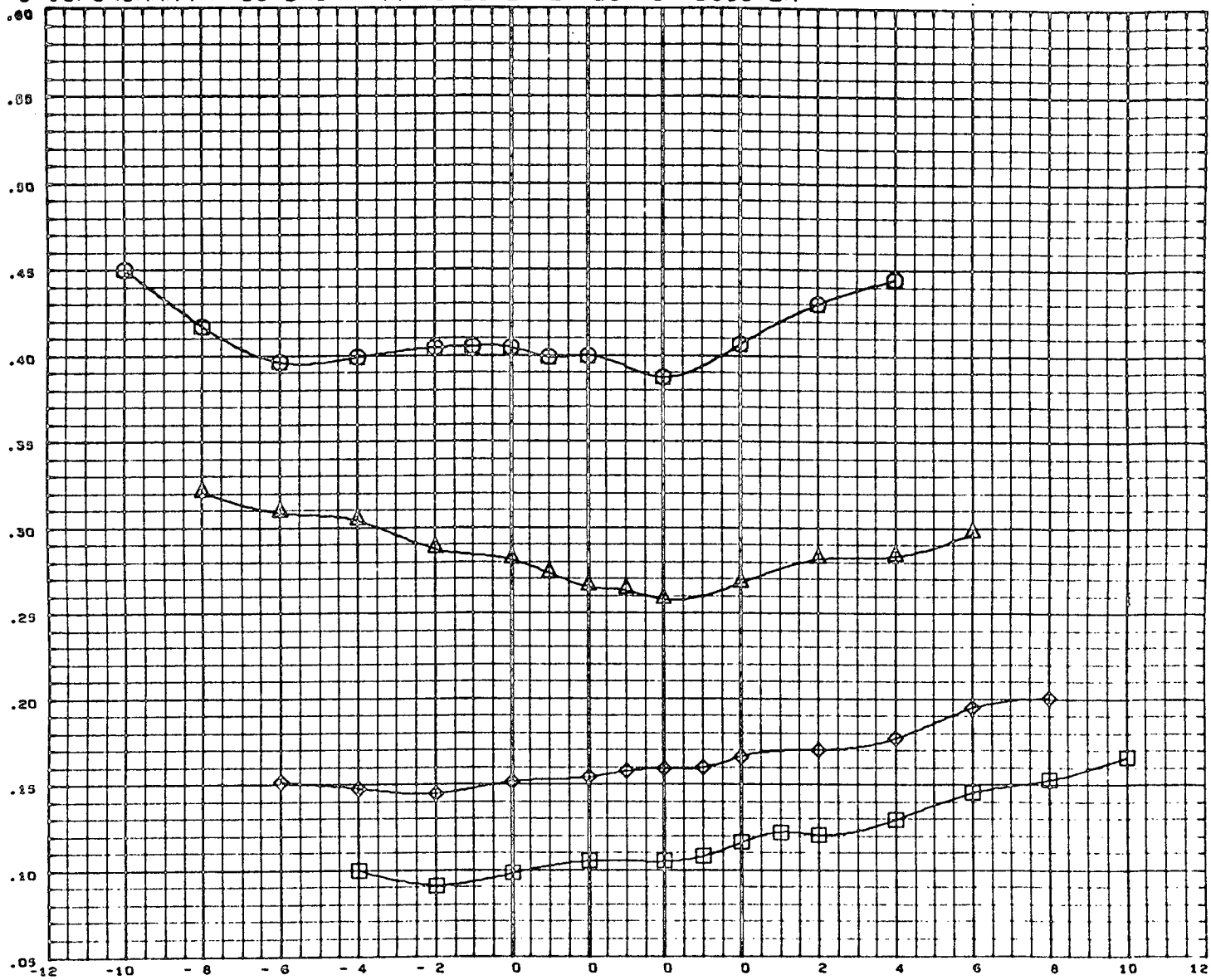
SYMBOL	MACH	PARAMETRIC VALUES	
○	0.600	BETA	0.000
△	0.900		
◇	1.000		
□	1.100		

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



SYMBOL	MACH	PARAMETRIC VALUES	
	1.200	BETA	0.000
	1.960		
	3.500		
	4.960		

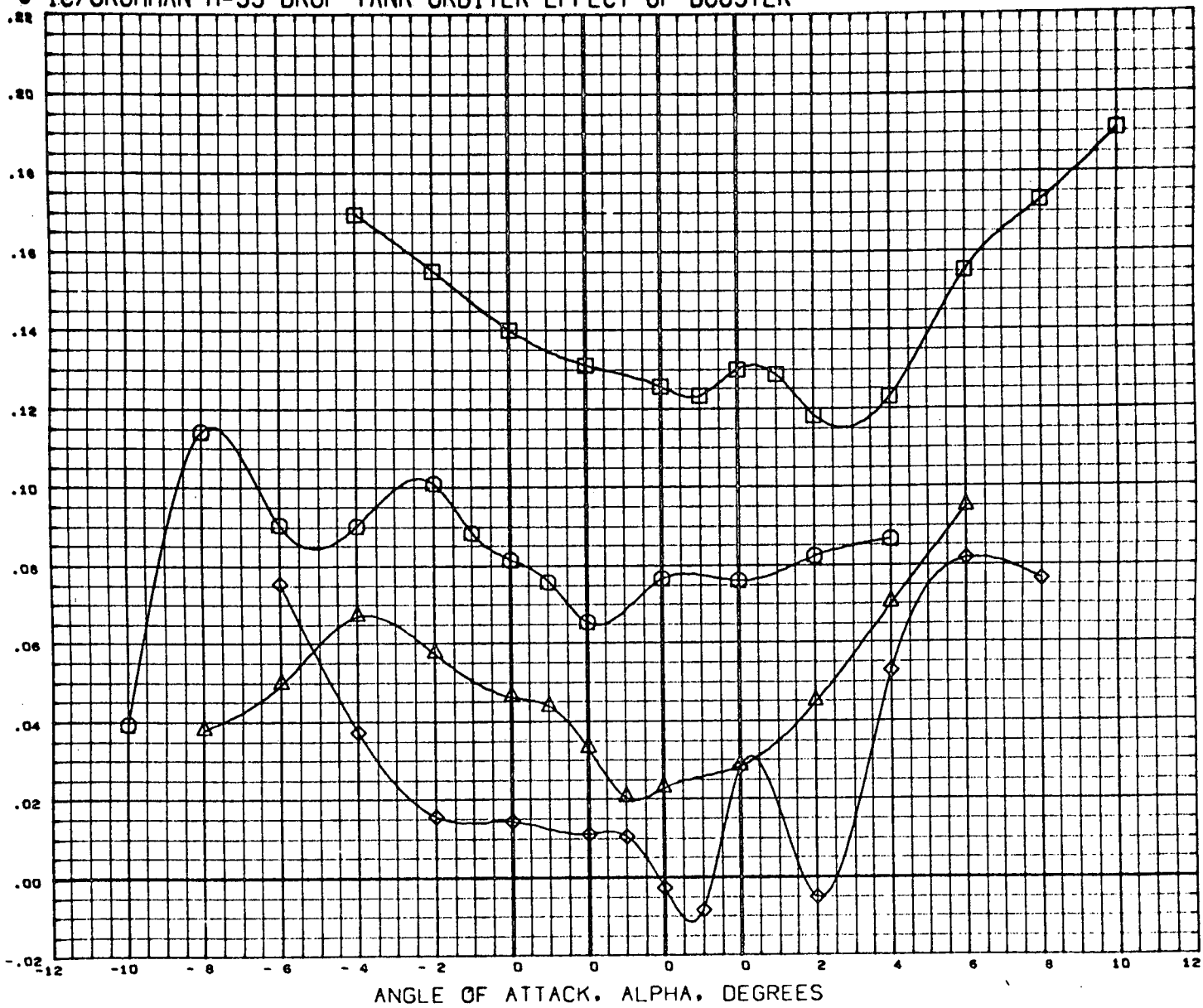
DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

M502-MSFC-S1C INCREMENTAL DATA(OWVTCBF-OWVTC) (J44041) 12 MAY 72 PAGE 370

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



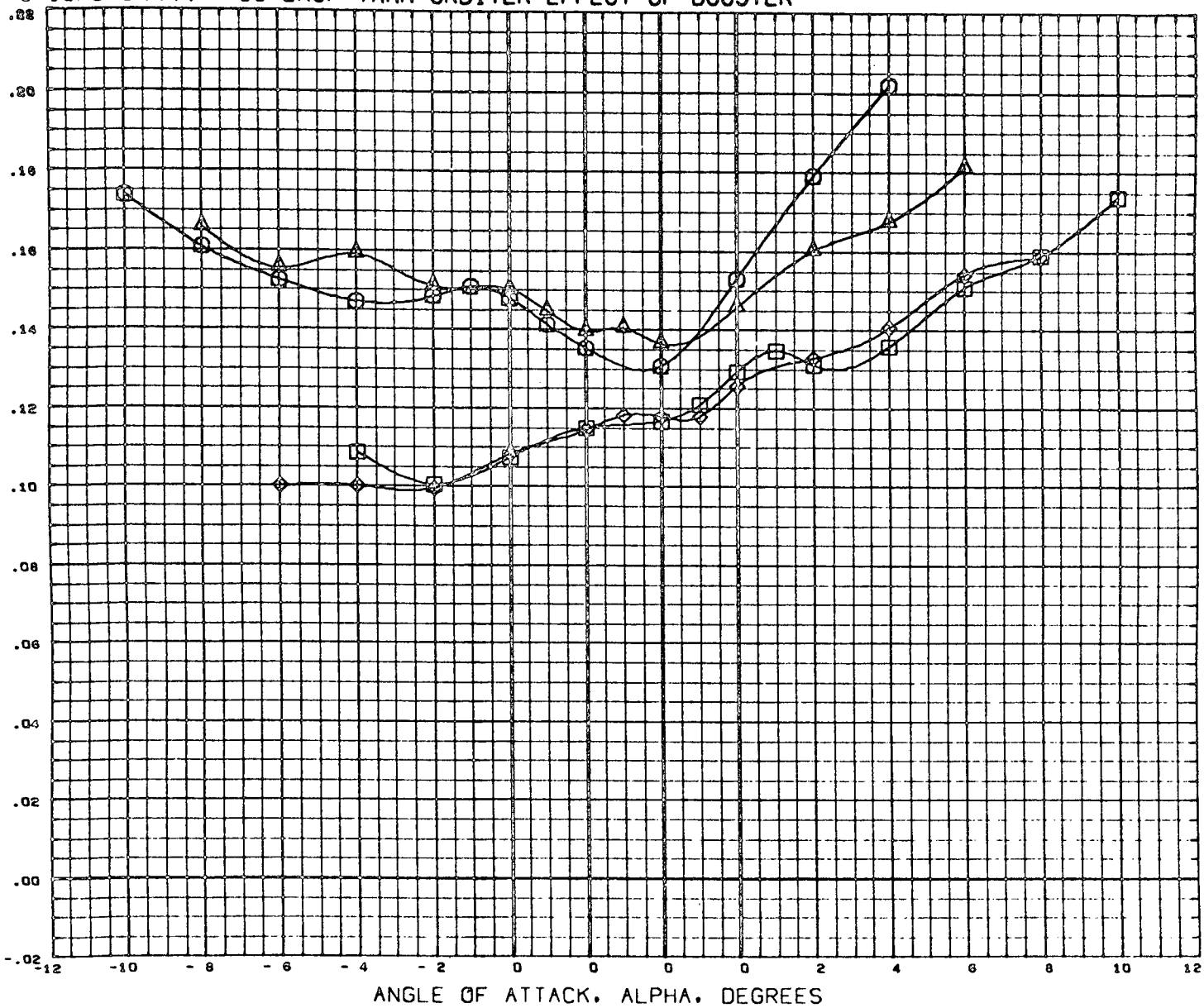
SYMBOL	MACH	PARAMETRIC VALUES	
○	0.600	BETA	0.000
△	0.900		
◇	1.000		
□	1.100		

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

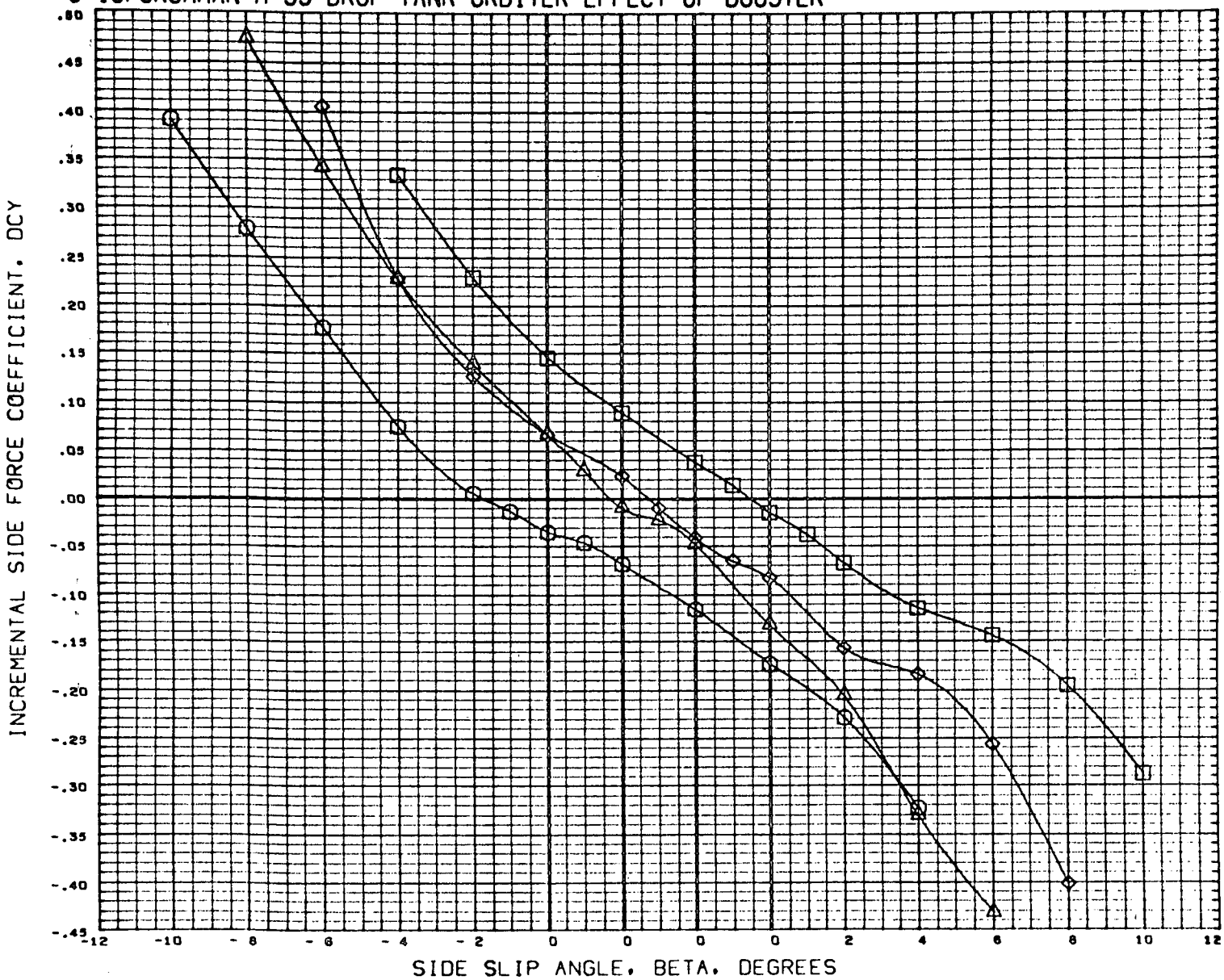


SYMBOL	MACH	PARAMETRIC VALUES	
○	1.200	BETA	0.000
△	1.960		
◇	3.500		
□	4.960		

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



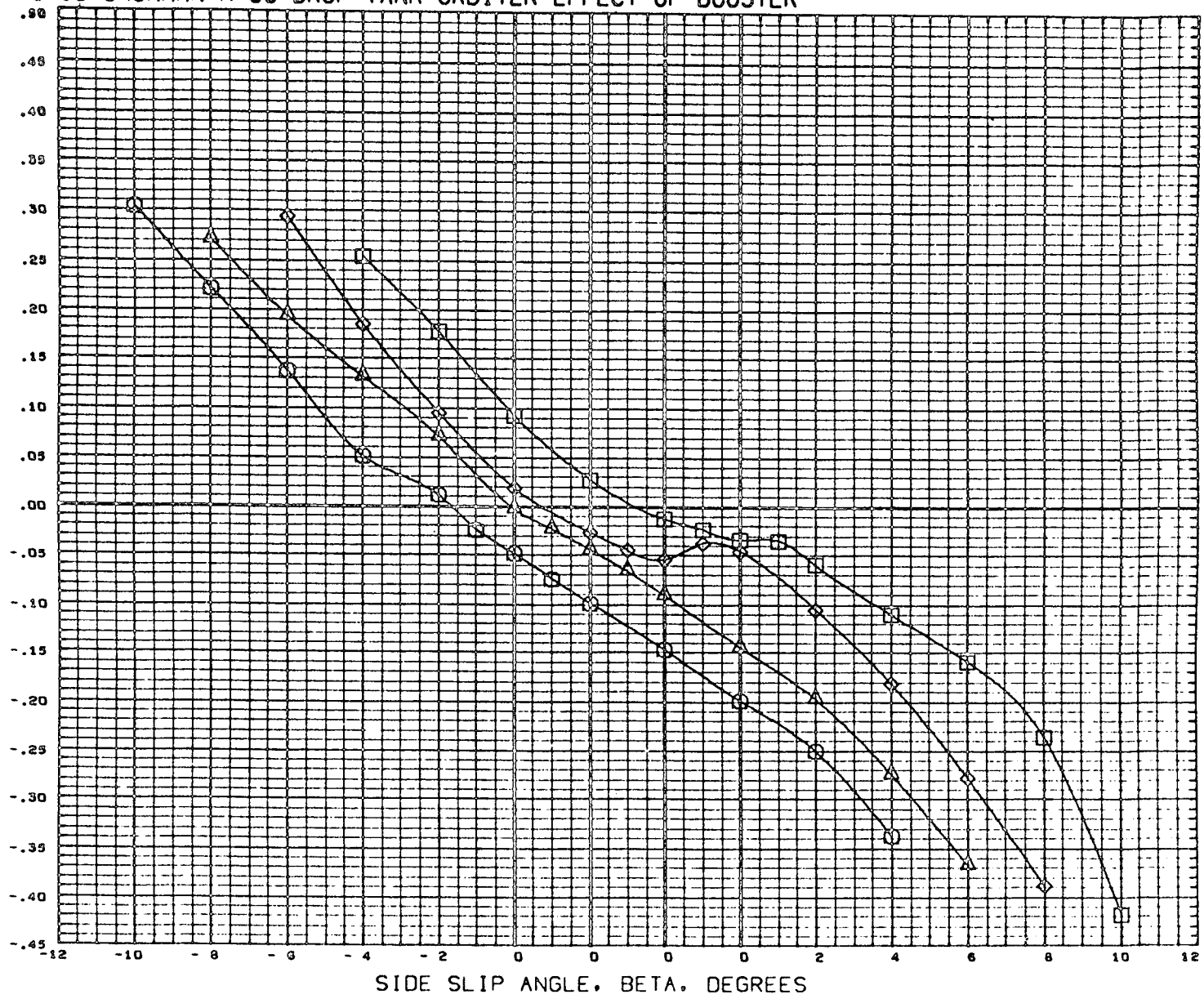
SYMBOL	MACH	PARAMETRIC VALUES	
○	0.600	ALPHA	0.000
△	0.900		
◇	1.000		
□	1.100		

DATA HIST. CODE ⊕ACCCI⊕A⊕C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



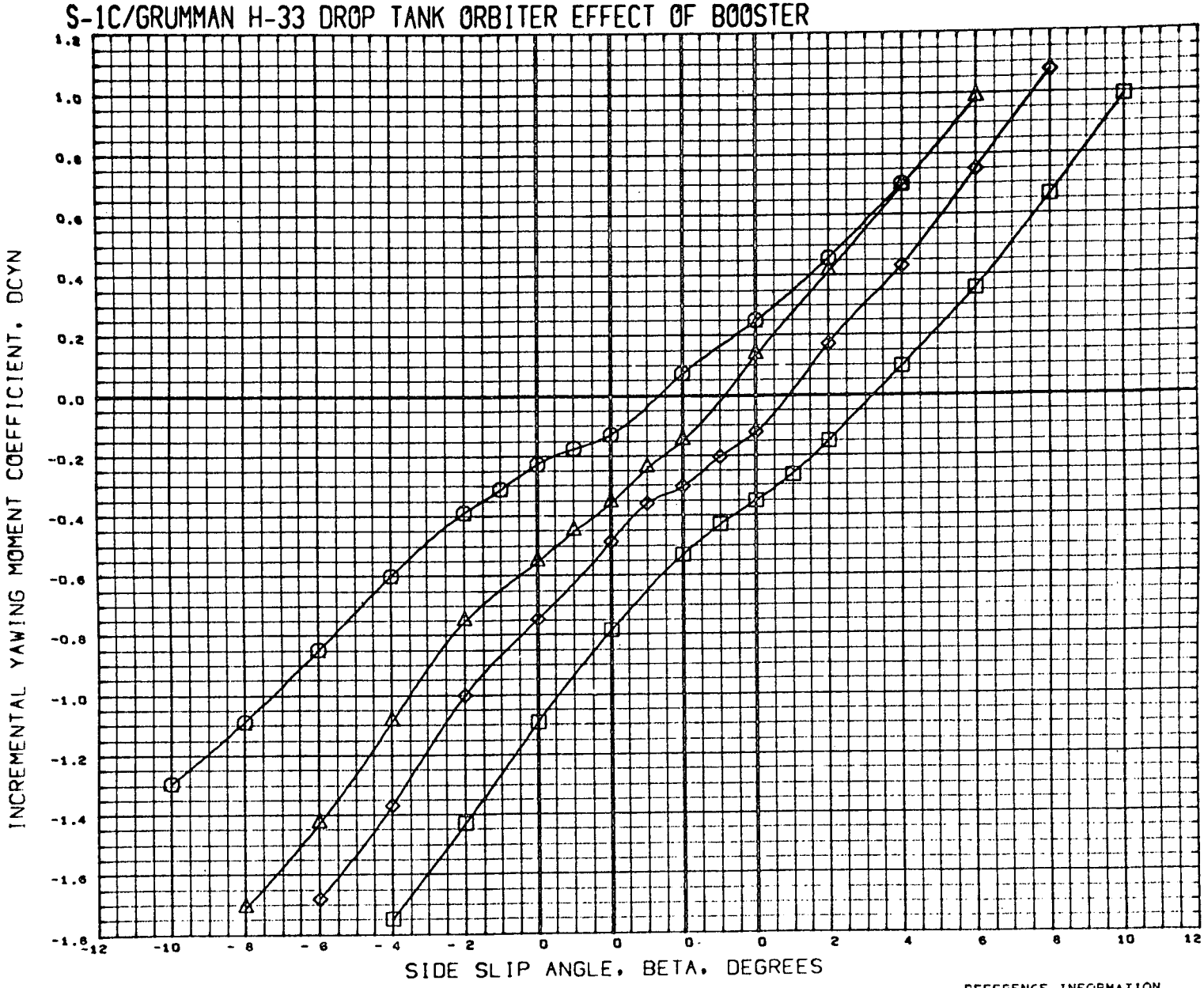
SYMBOL	MACH	PARAMETRIC VALUES	
○	1.200	ALPHA	0.000
▷	1.960		
◇	3.500		
□	4.960		

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



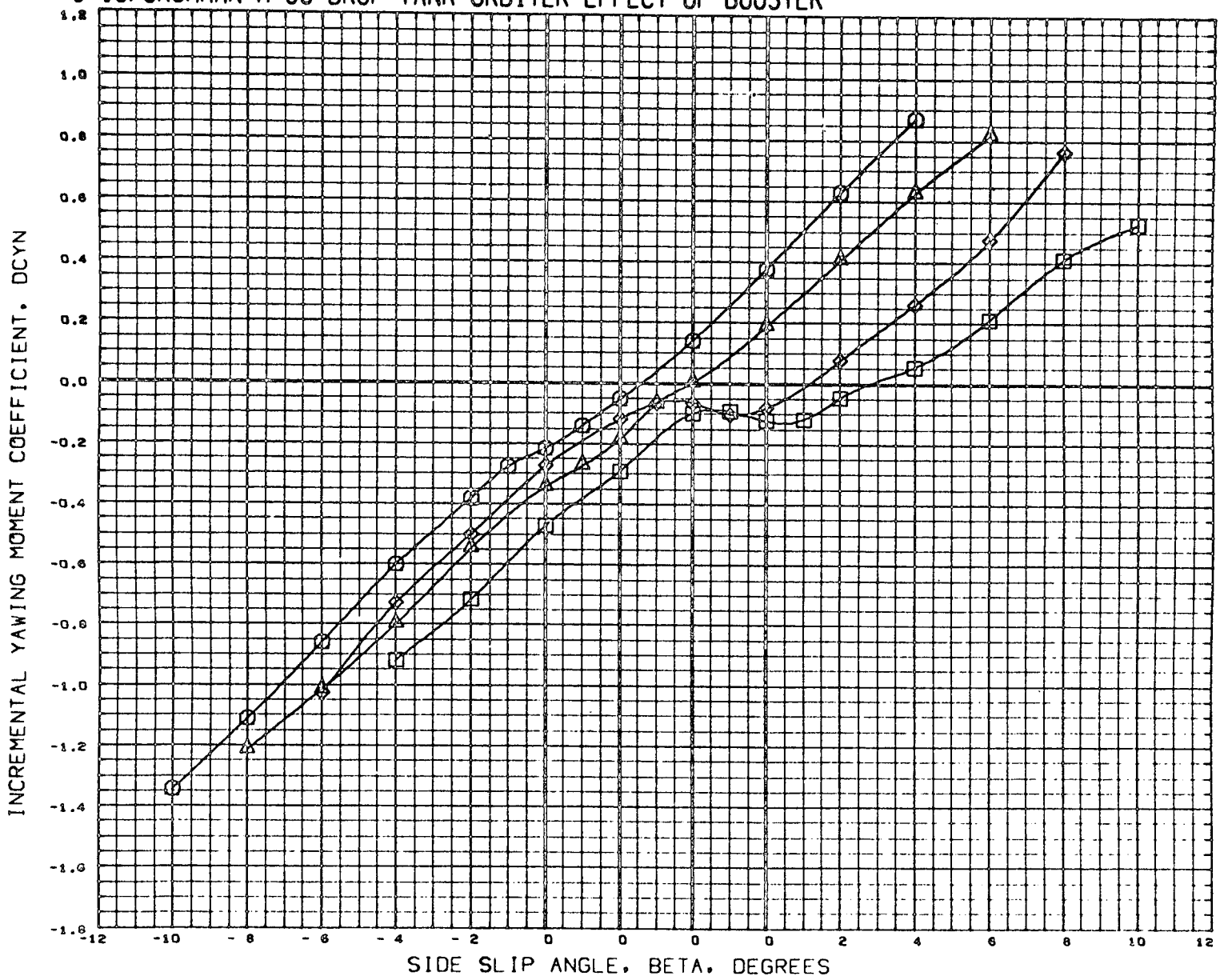
SYMBOL	MACH		PARAMETRIC VALUES
○	0.600	ALPHA	0.000
△	0.900		
◇	1.000		
□	1.100		

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



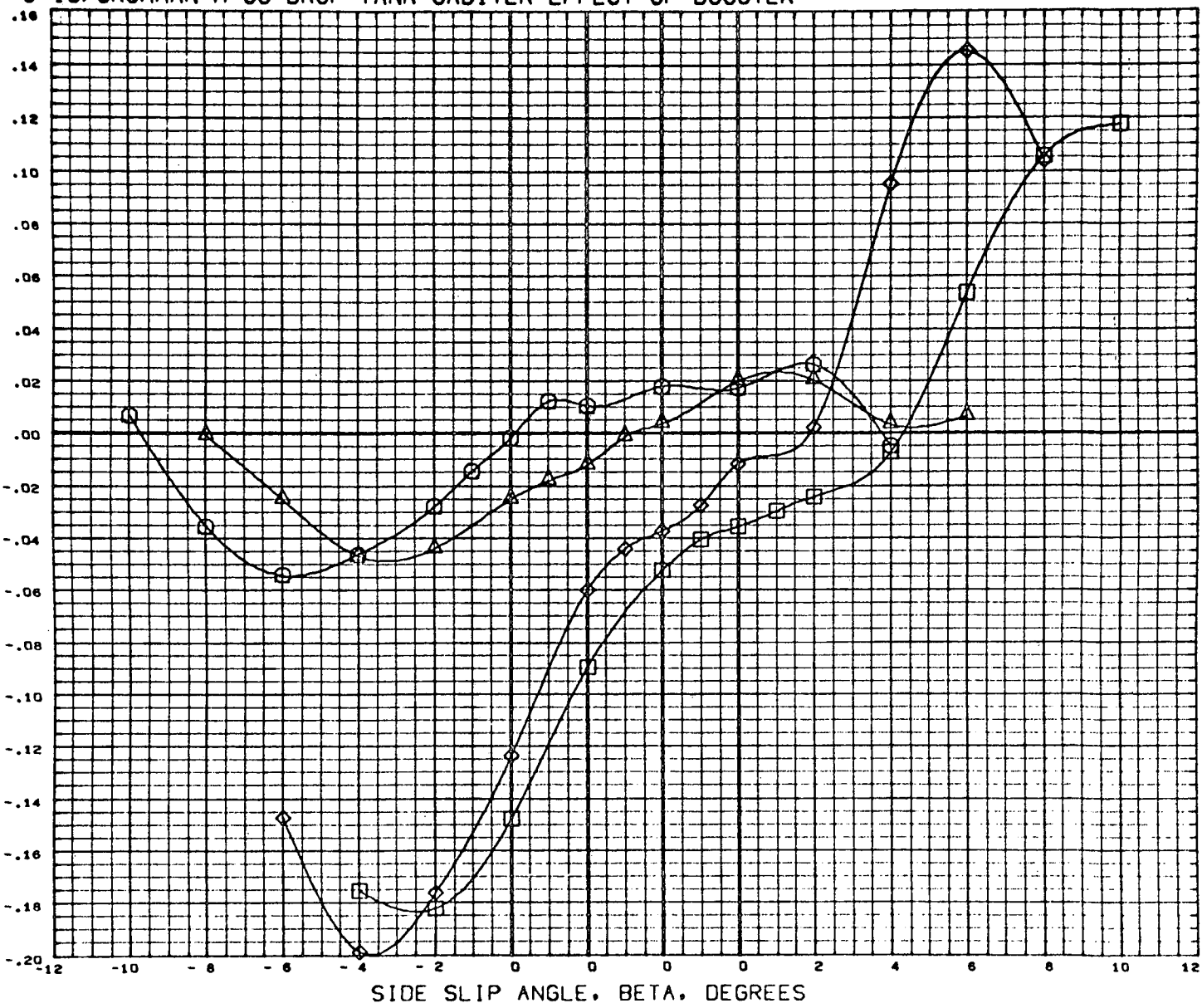
SYMBOL	MACH	PARAMETRIC VALUES	
○	1.200	ALPHA	0.000
△	1.960		
◇	3.900		
□	4.960		

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



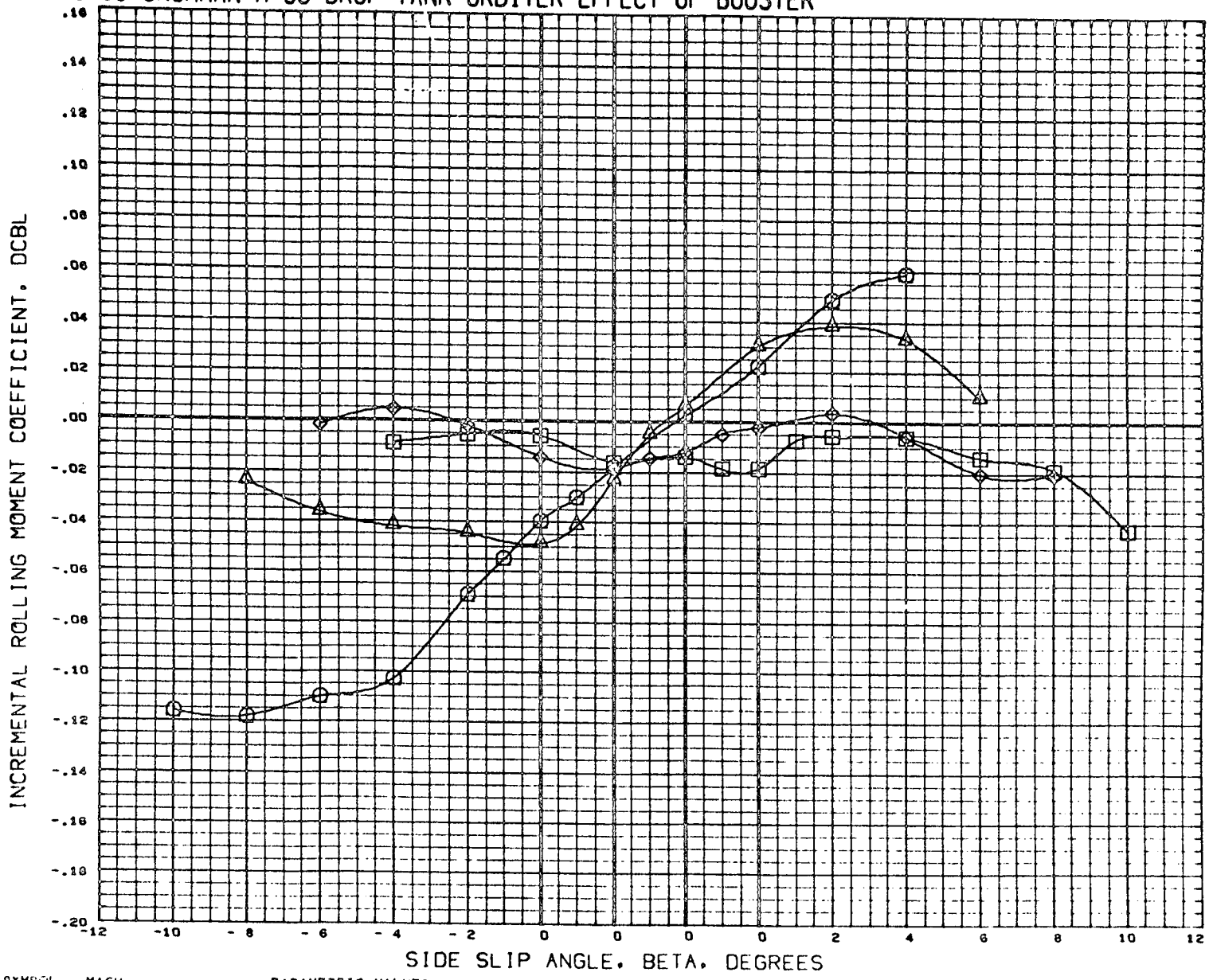
SYMBOL	MACH	PARAMETRIC VALUES	
○	0.600	ALPHA	0.000
△	0.900		
◇	1.000		
□	1.100		

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



SYMBOL	MACH
○	1.200
△	1.960
◇	3.500
□	4.960

PARAMETRIC VALUES

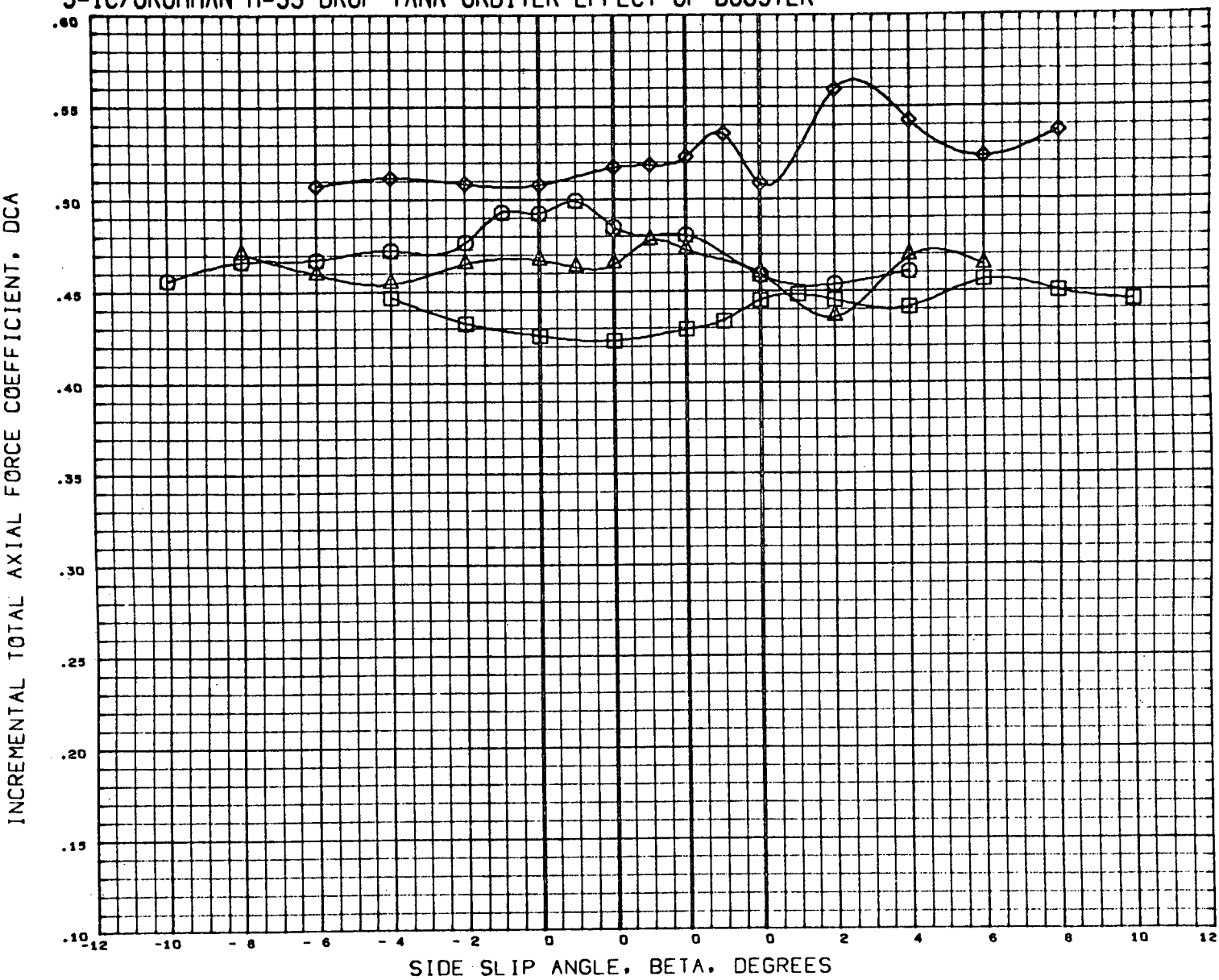
ALPHA 0.000

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



SYMBOL	MACH
○	0.600
△	0.900
◇	1.000
□	1.100

PARAMETRIC VALUES

ALPHA 0.000

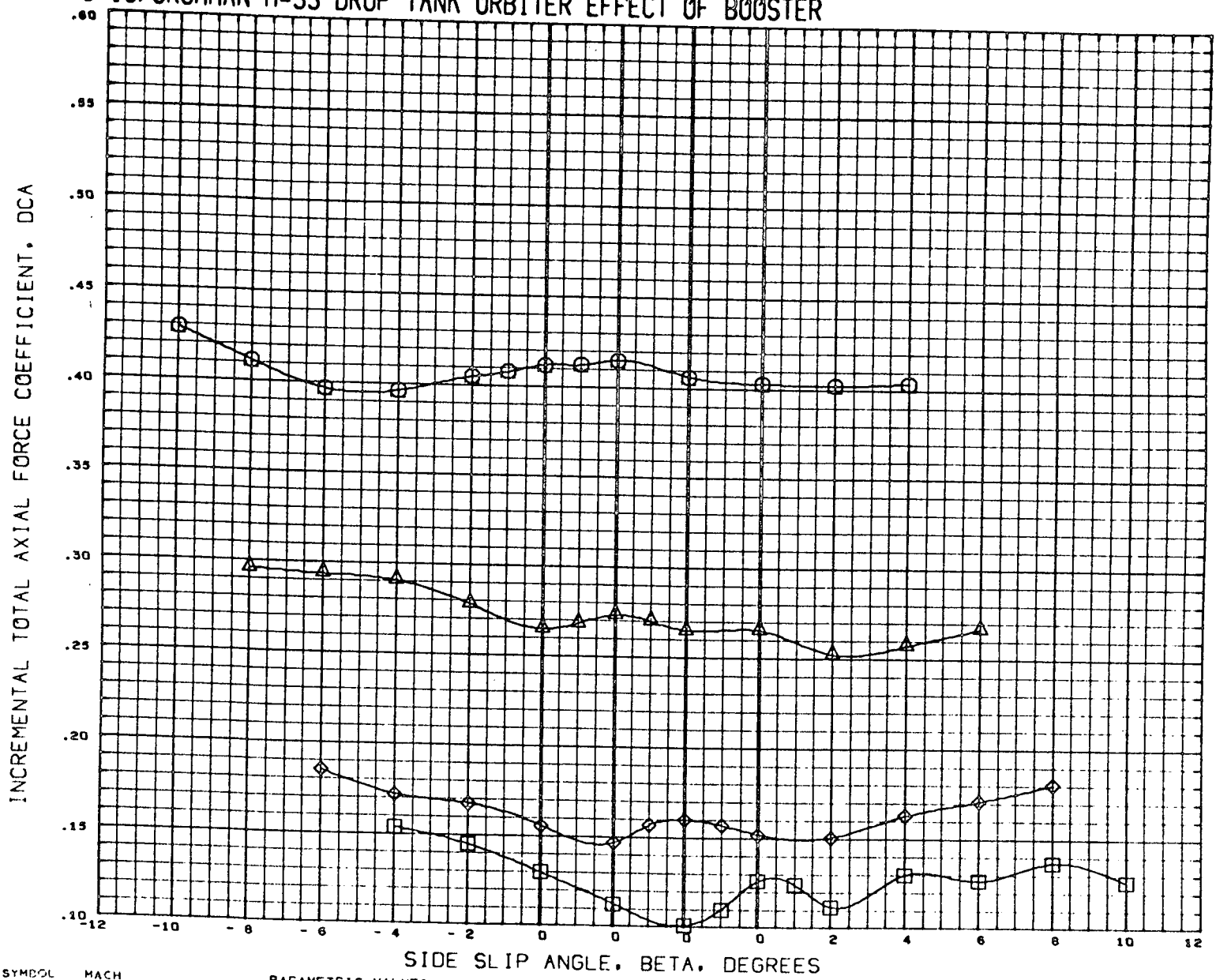
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

M502-MSFC-S1C INCREMENTAL DATA(0WVTCBF-0WVTC) (J44045) 12 MAY 72 PAGE 379

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



SYMBOL	MACH
○	1.200
△	1.960
◇	3.500
□	4.960

PARAMETRIC VALUES

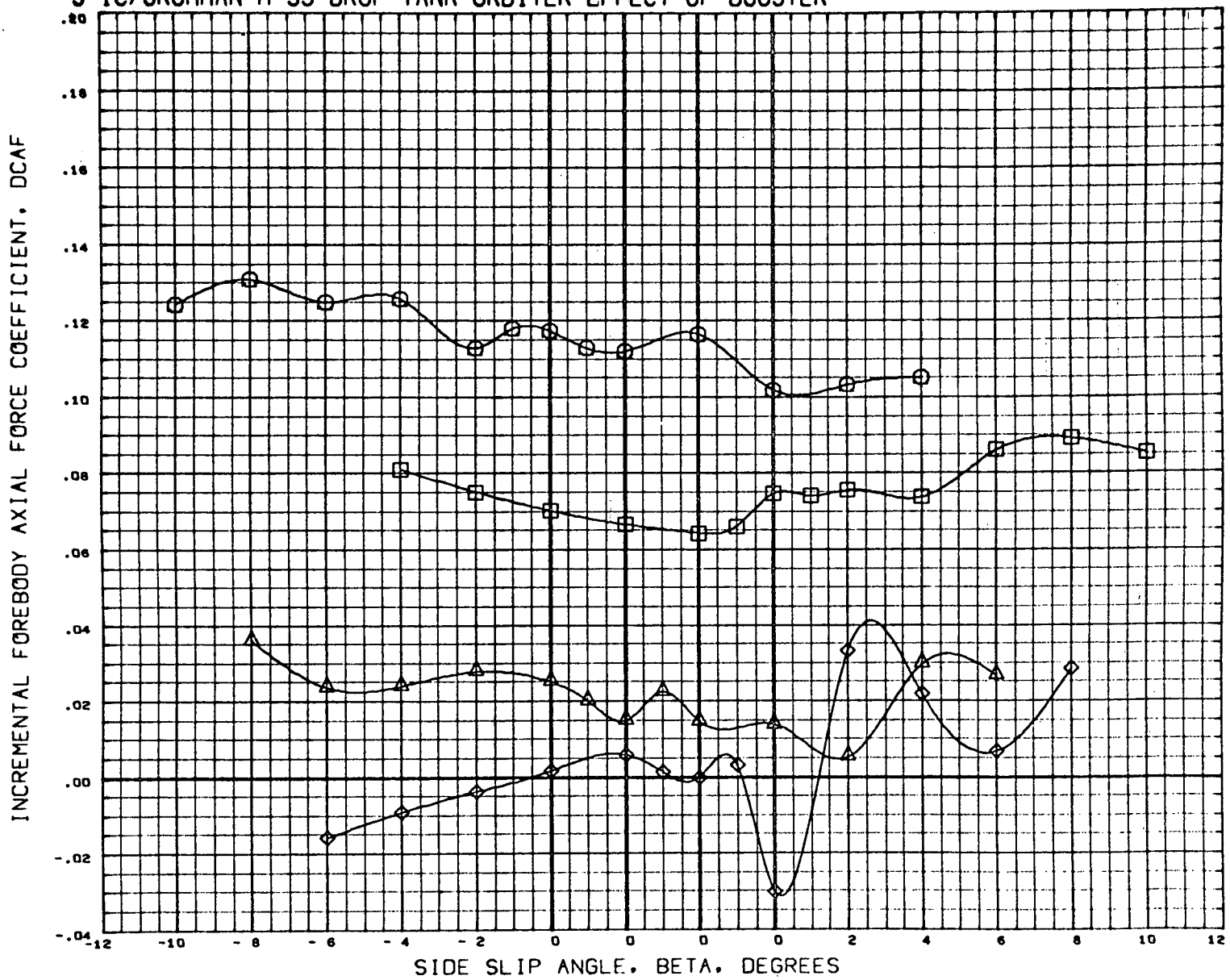
ALPHA 0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



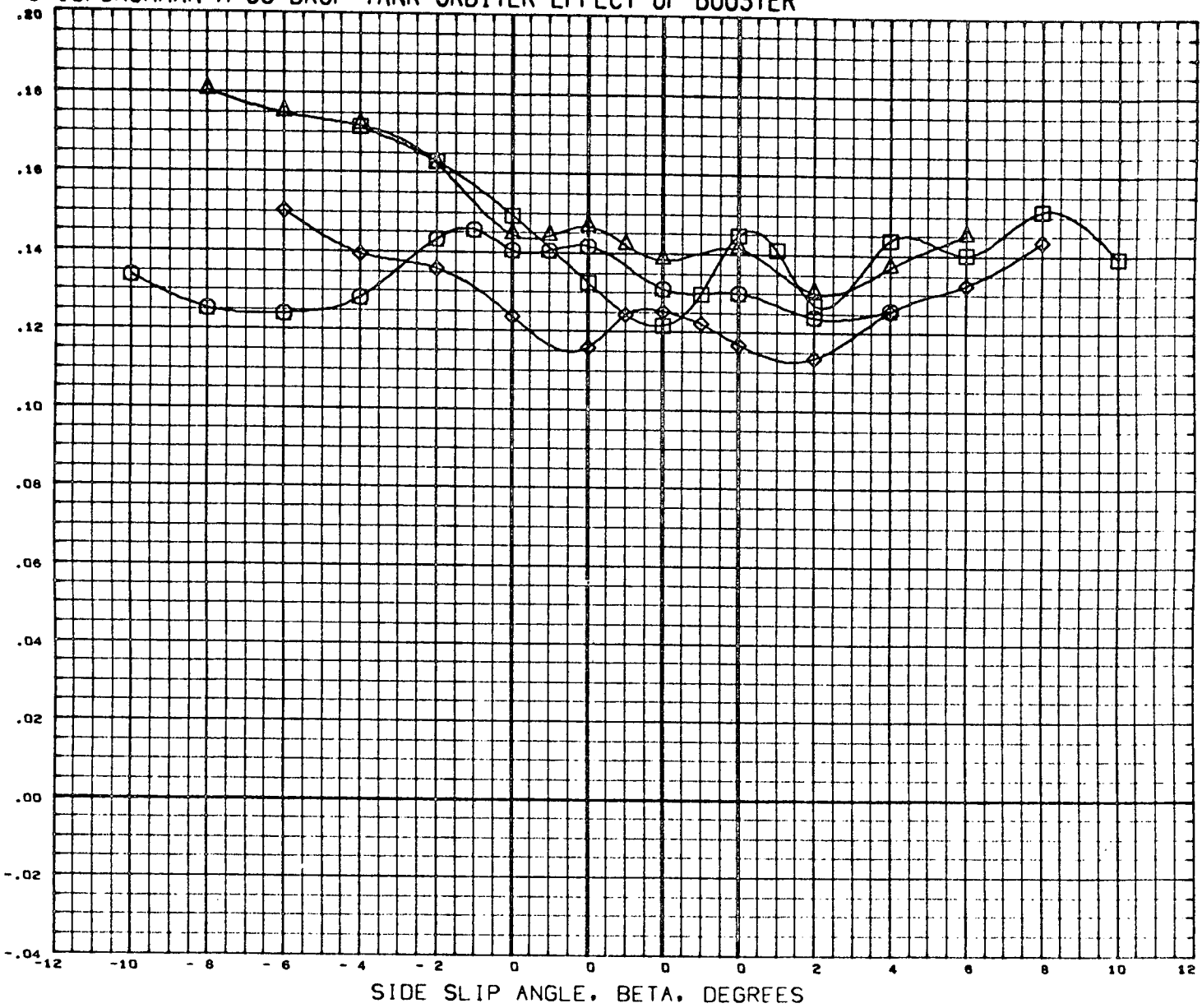
SYMBOL	MACH	PARAMETRIC VALUES	
○	0.600	ALPHA	0.000
△	0.900		
◇	1.000		
□	1.100		

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



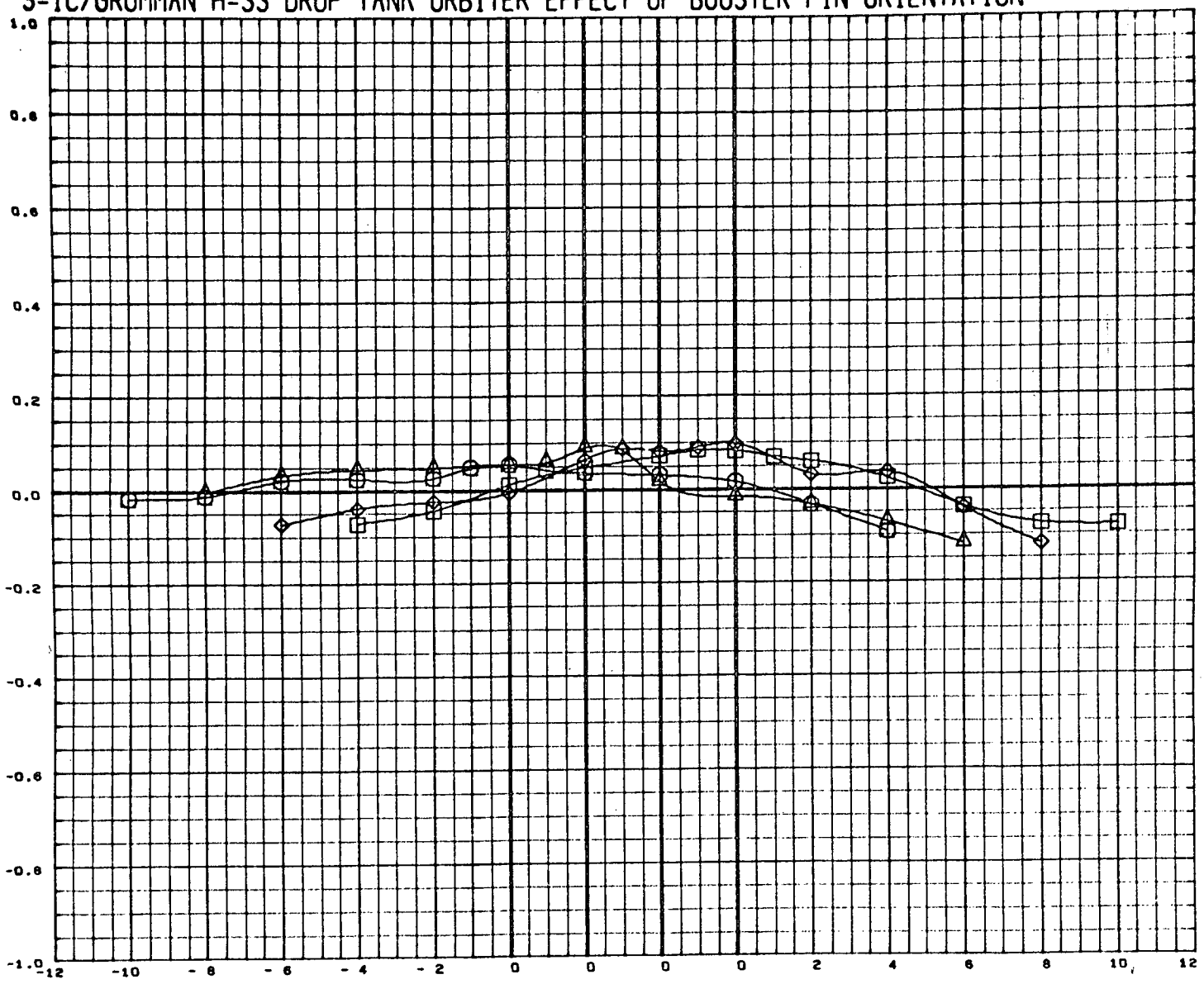
SYMBOL	MACH	PARAMETRIC VALUES	
○	1.200	ALPHA	0.000
△	1.960		
◇	3.500		
□	4.960		

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



SYMBOL	MACH
○	0.600
△	0.900
◇	1.000
□	1.200

PARAMETRIC VALUES

BETA 0.000 PHI 0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

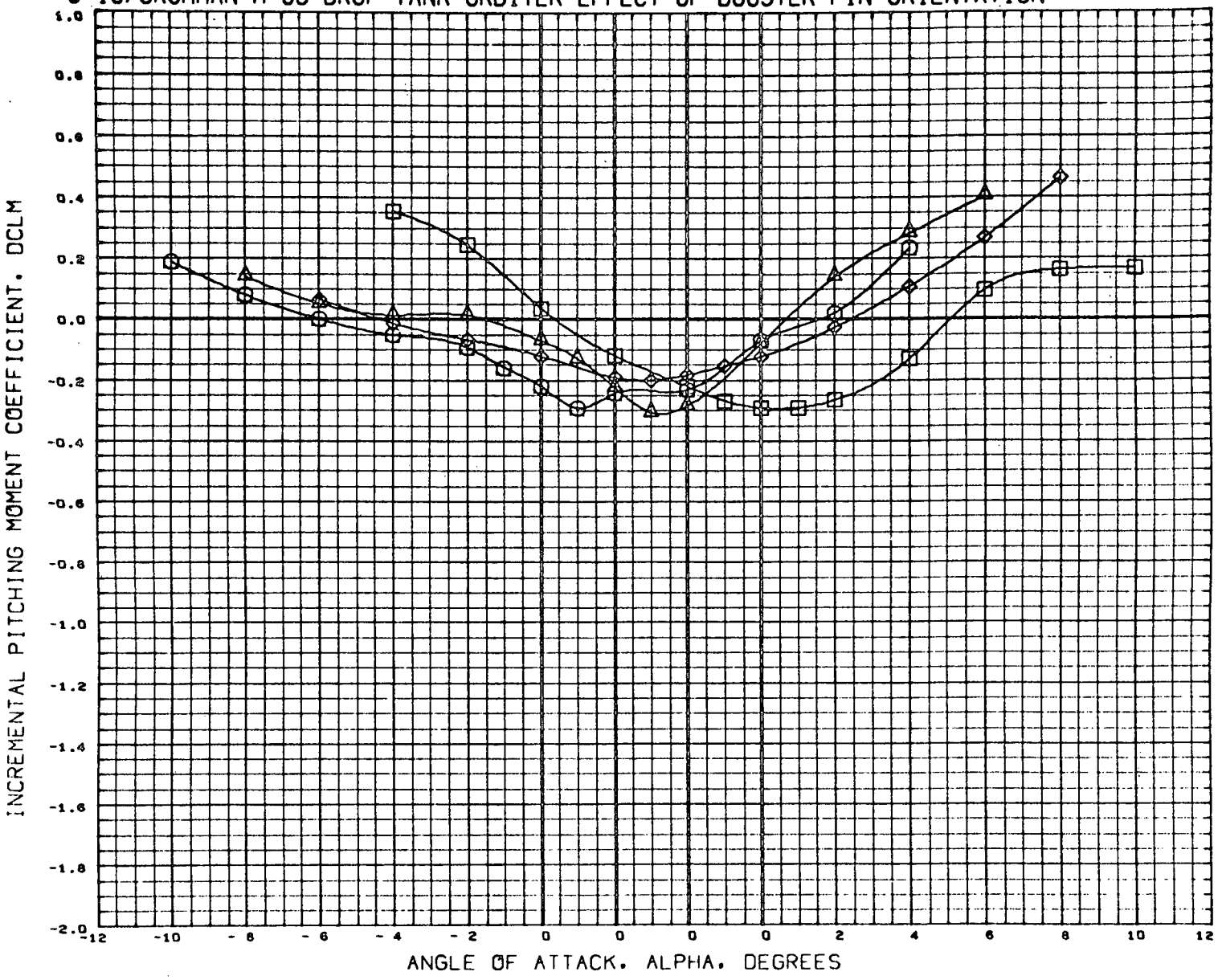
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	BETA	0.000	PHI	0.000
△	3.500				
◇	4.960				

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



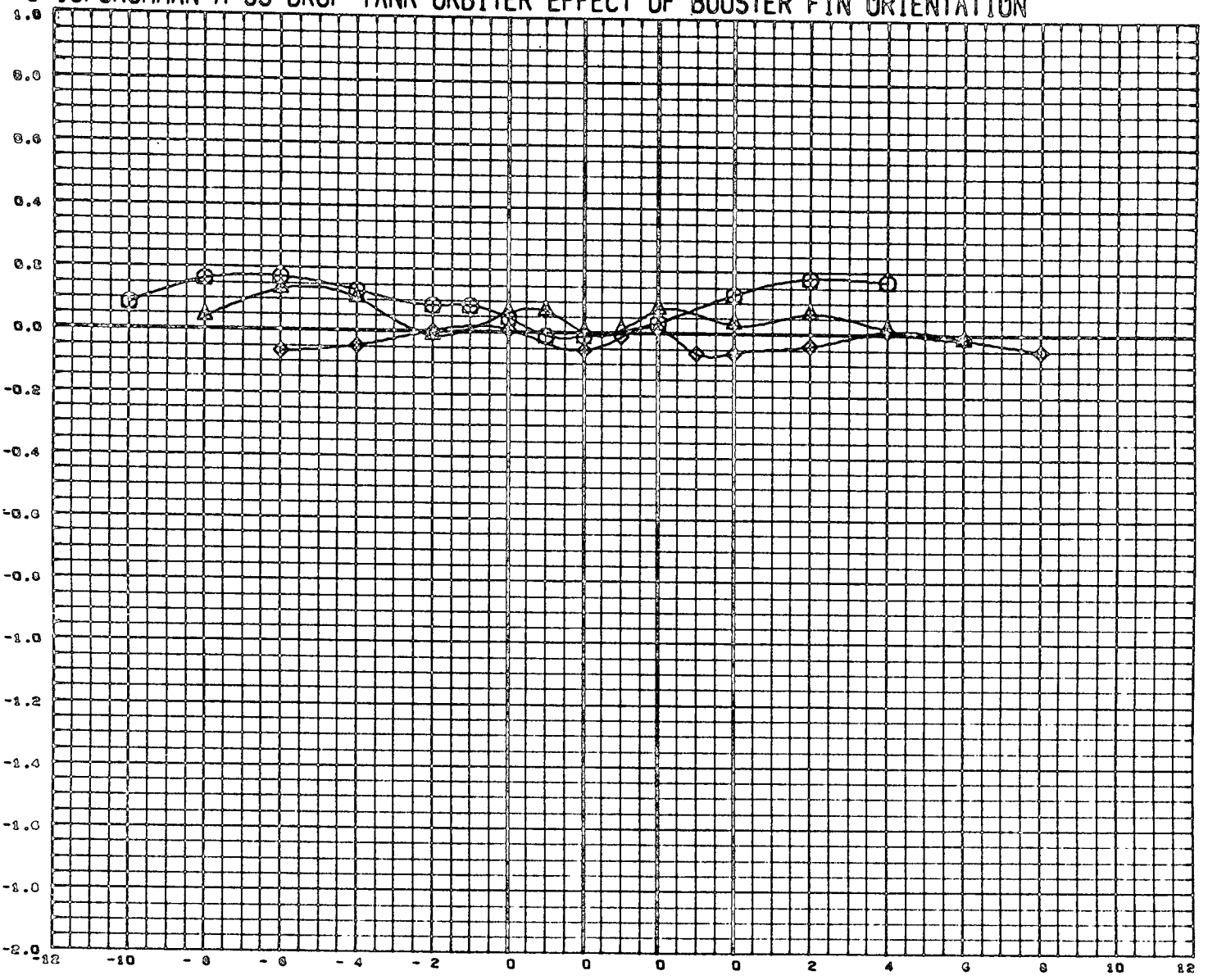
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.600	BETA	0.000	PHI	0.000
△	0.900				
◇	1.000				
□	1.200				

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



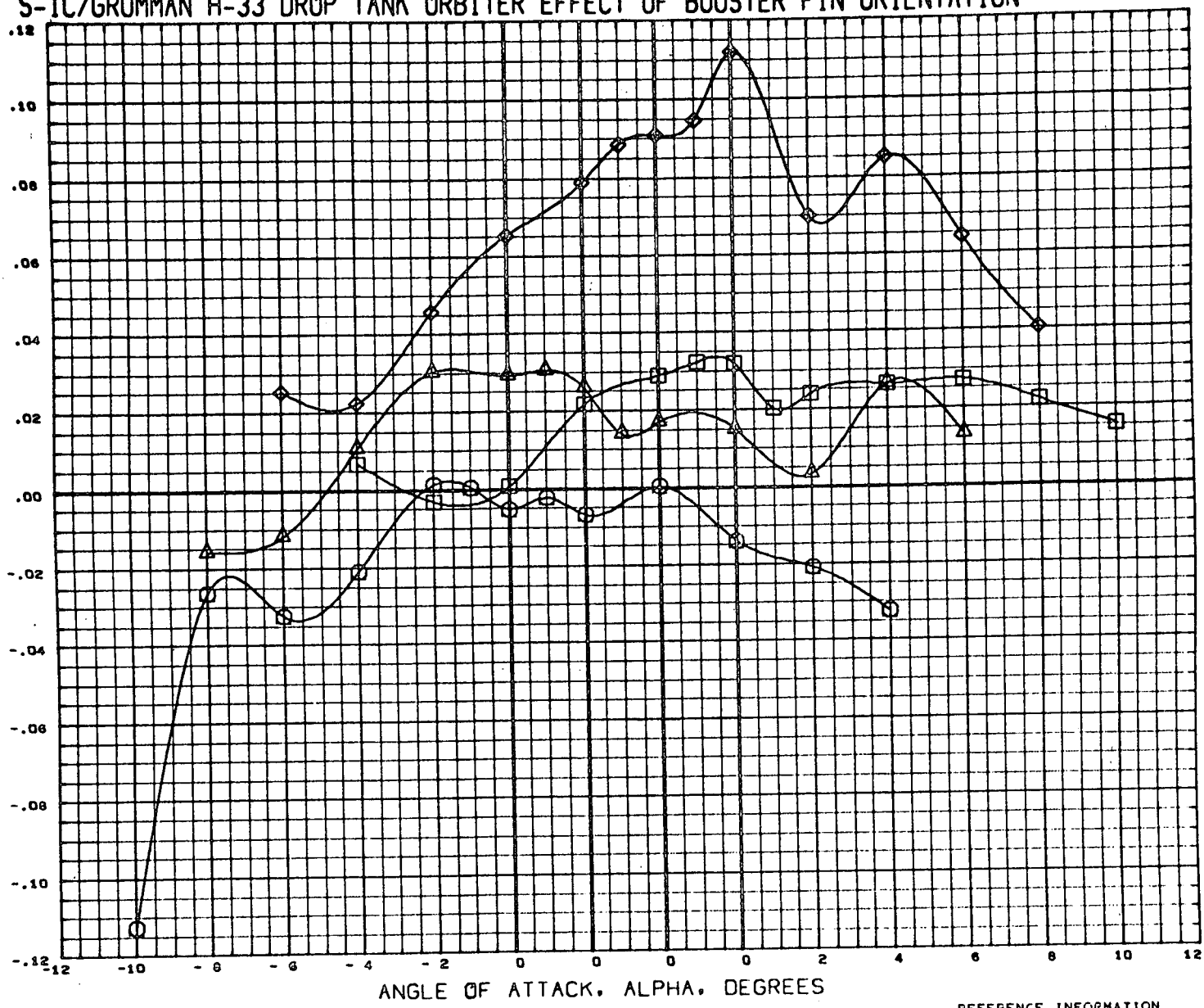
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.960	BETA	0.000	PHI	0.000
△	3.900				
◇	4.960				

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



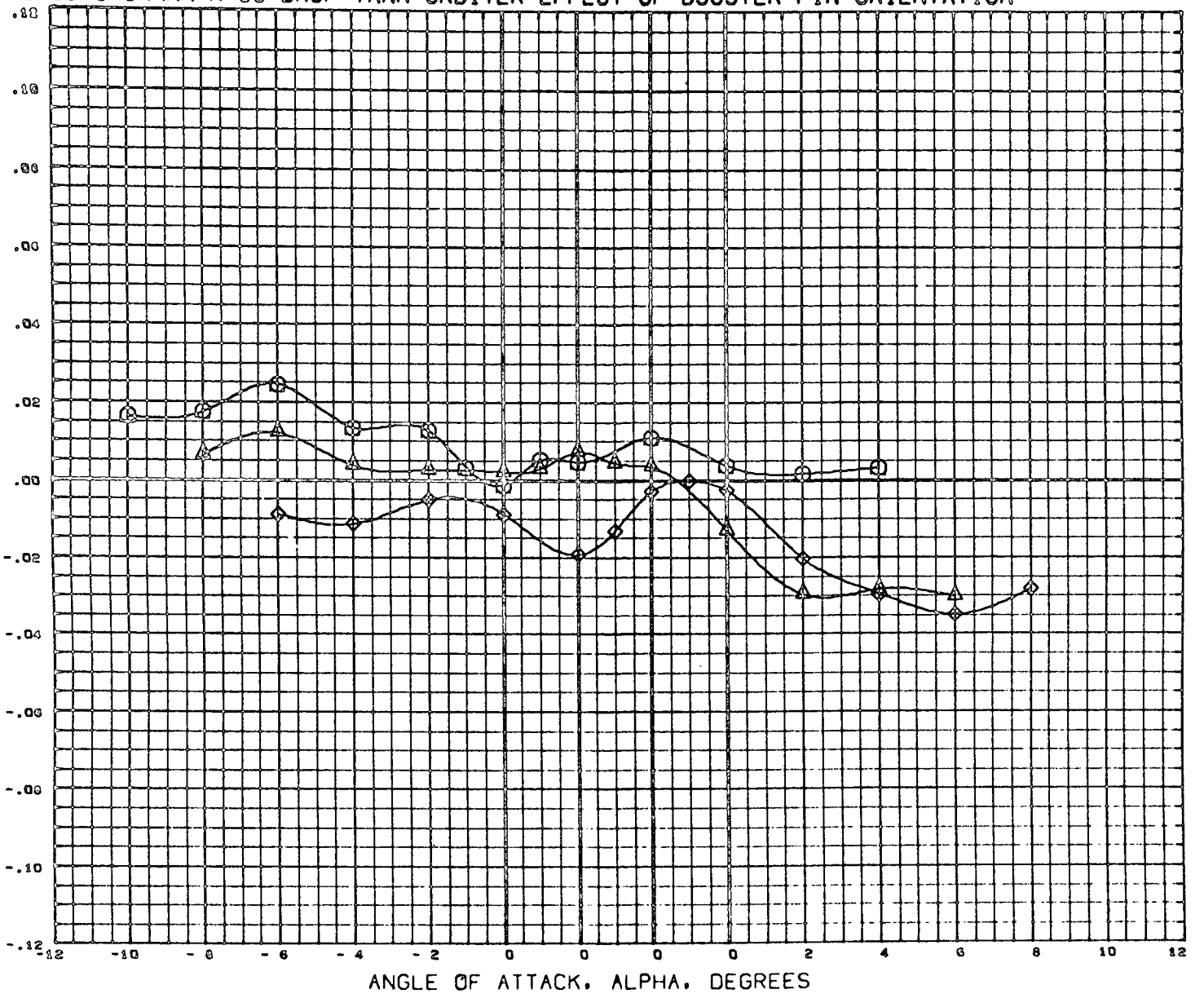
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.600	BETA	0.000	PHI	0.000
△	0.900				
◇	1.000				
□	1.200				

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



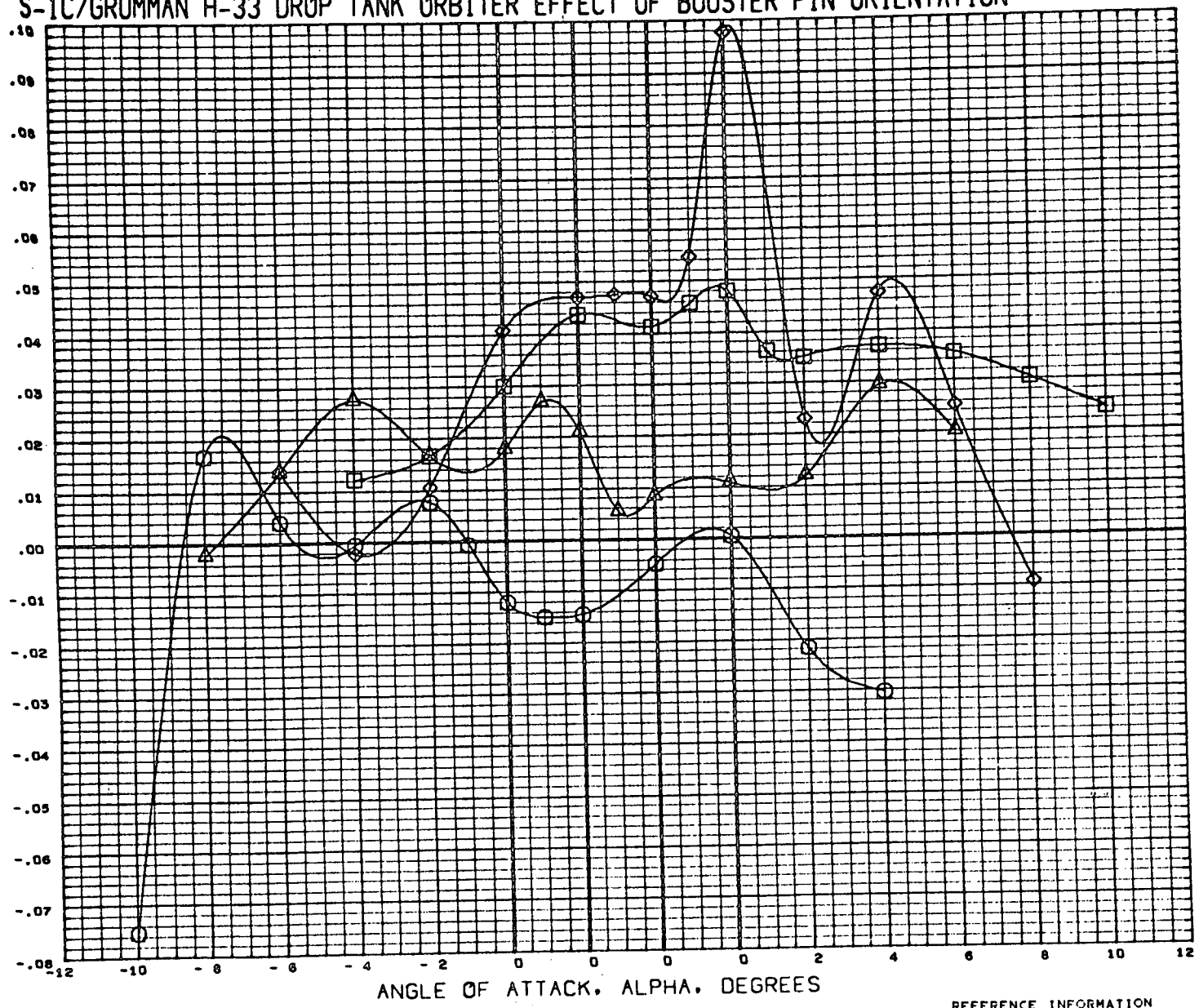
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	BETA	0.000	PHI	0.000
△	3.900				
◇	4.960				

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



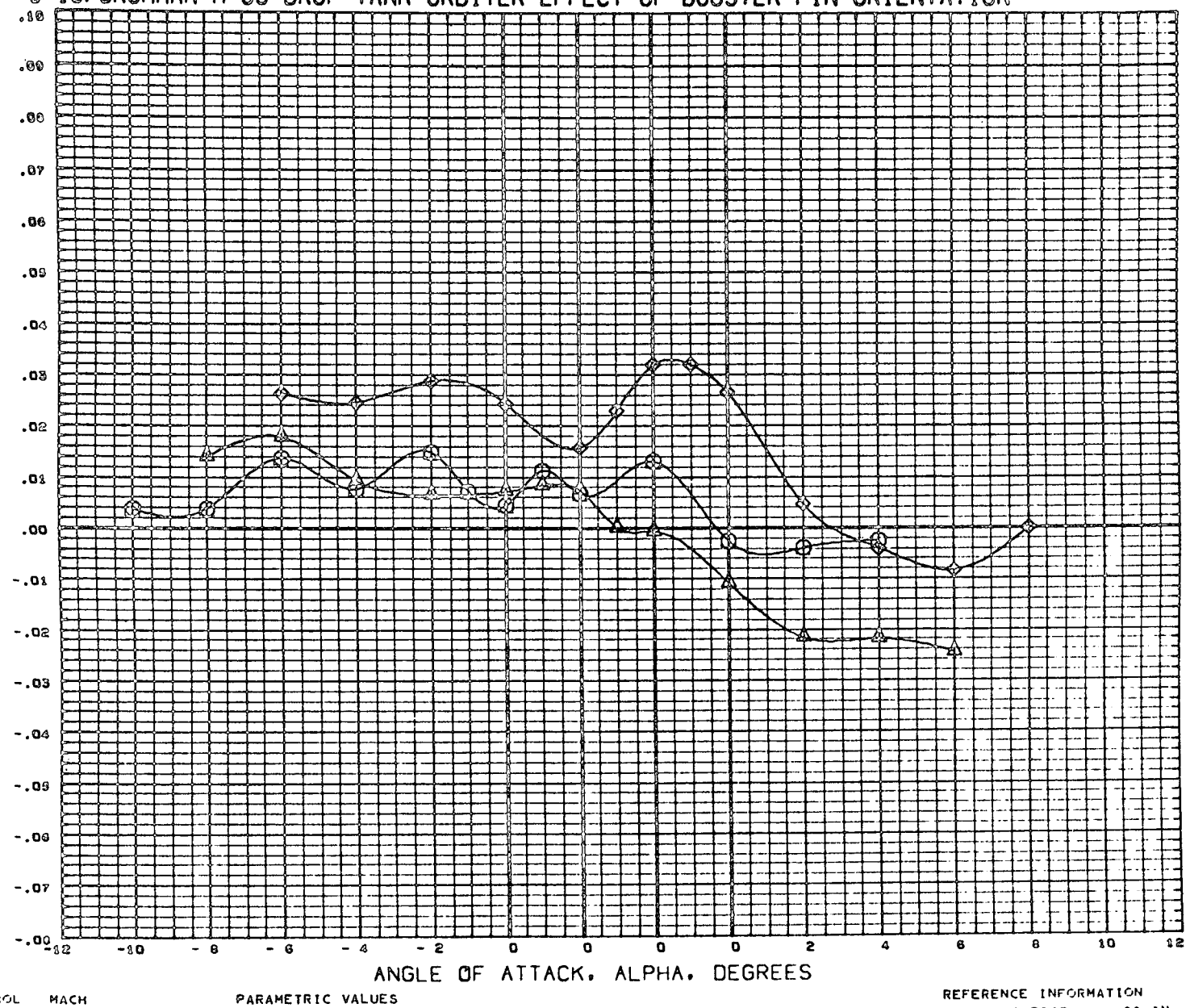
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.600	BETA	0.000	PHI	0.000
☒	0.900				
◇	1.000				
□	1.200				

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



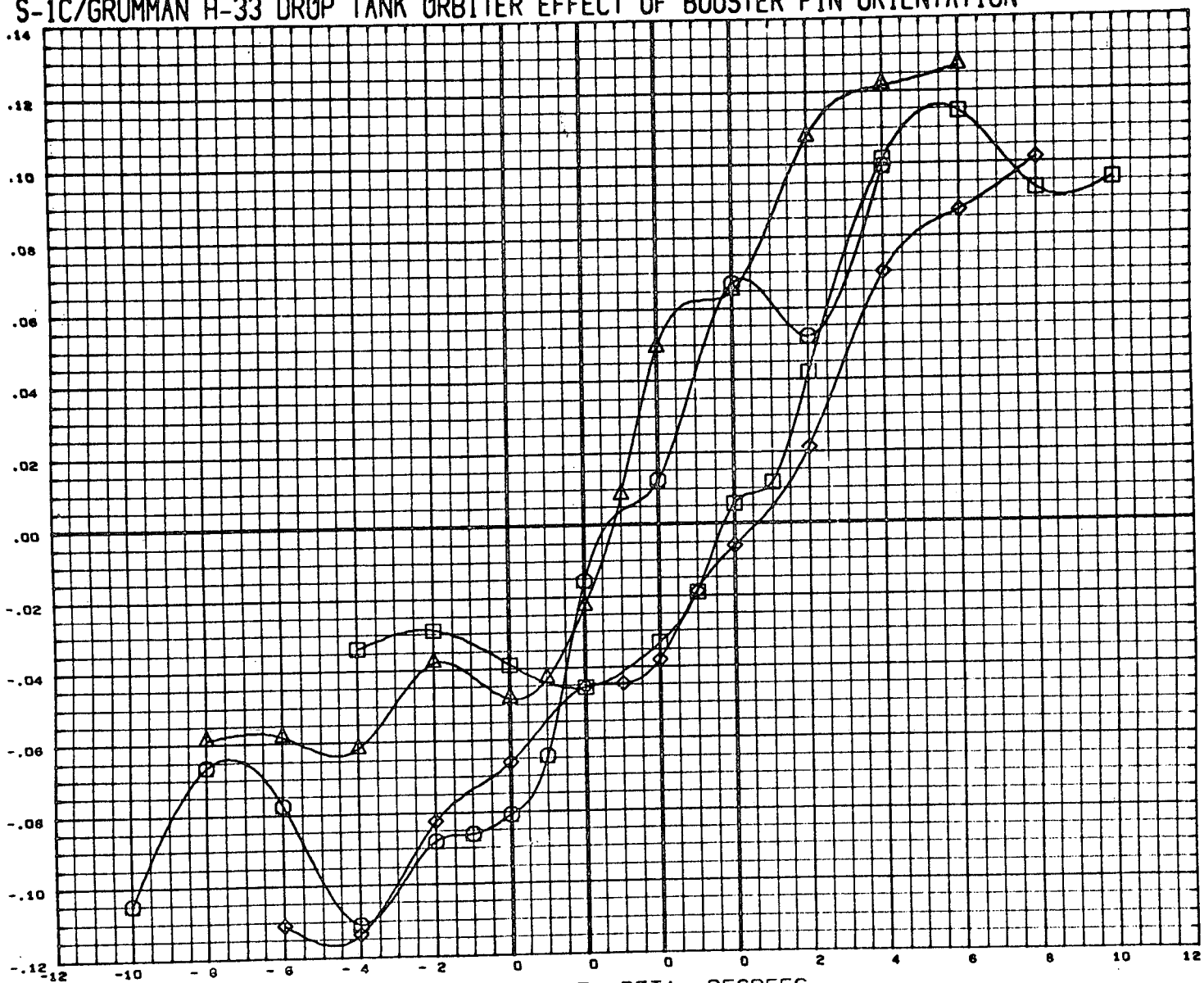
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.960	BETA	0.000	PHI	0.000
△	3.900				
◇	4.960				

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



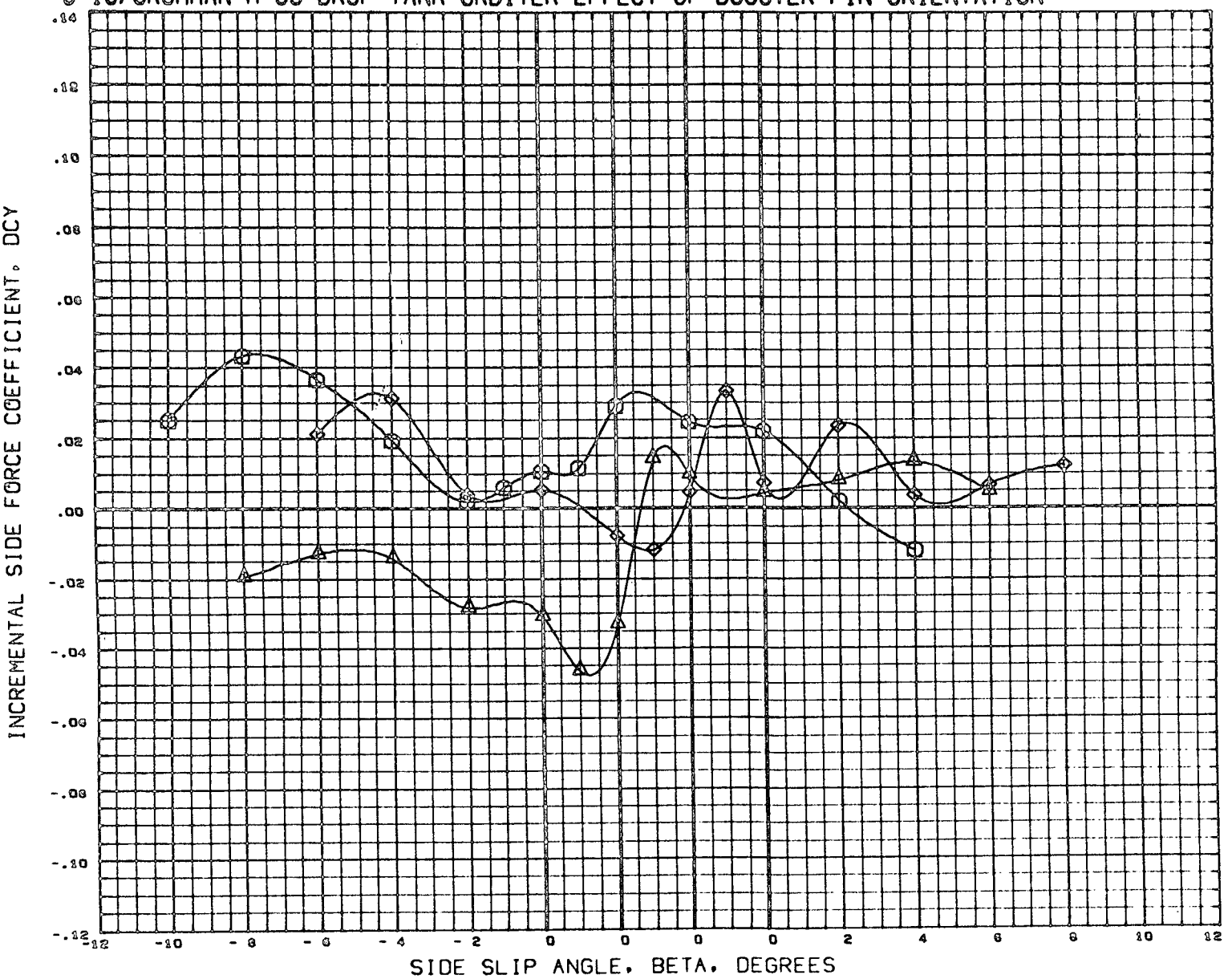
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.600	ALPHA	0.000	PHI	90.000
△	0.900				
◇	1.000				
□	1.200				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



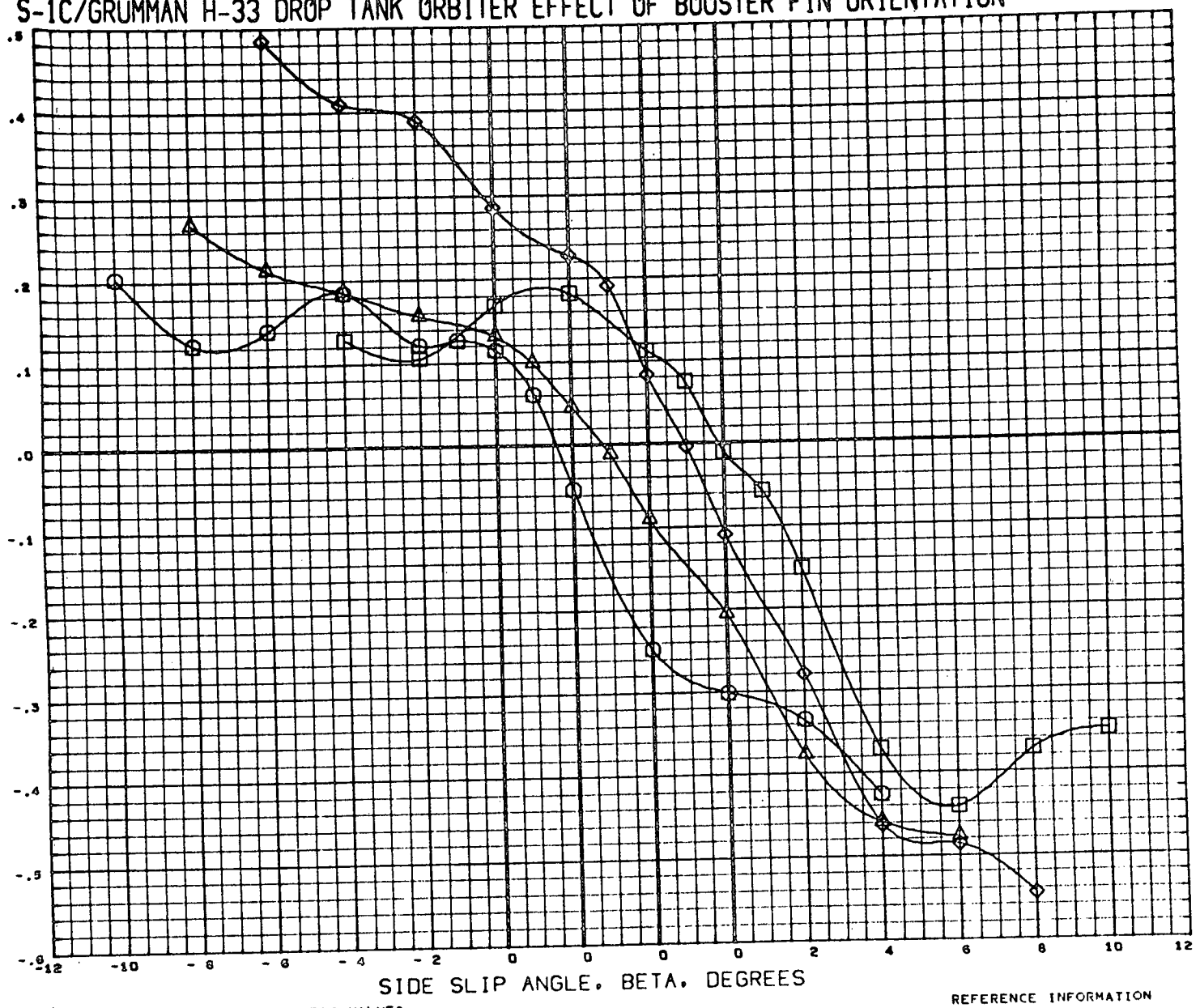
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.960	ALPHA	0.000	PHI	90.000
△	3.900				
◇	4.960				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



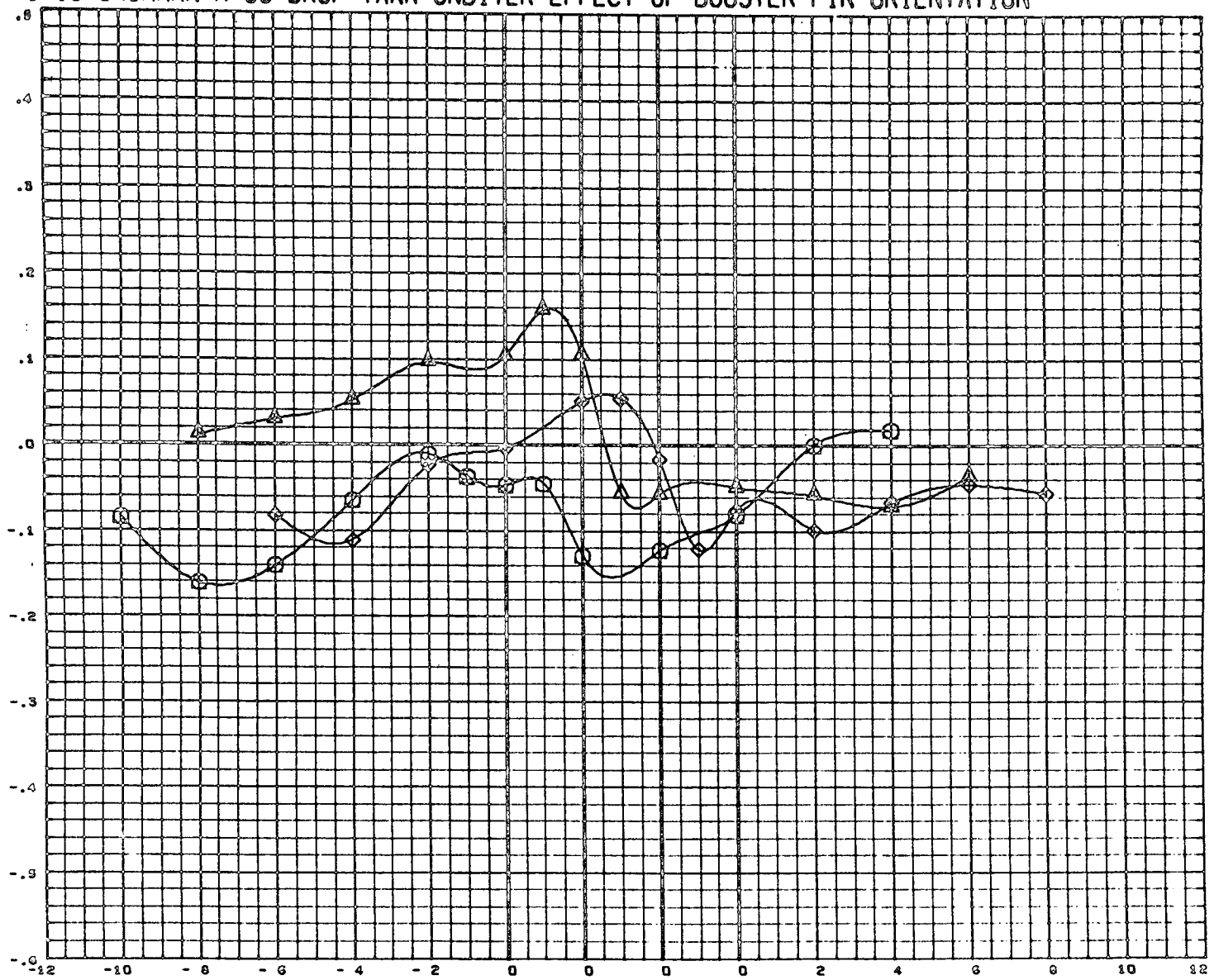
SYMBOL	MACH	PARAMETRIC VALUES		
○	0.600	ALPHA	0.000	PHI 90.000
△	0.900			
◇	1.000			
□	1.200			

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

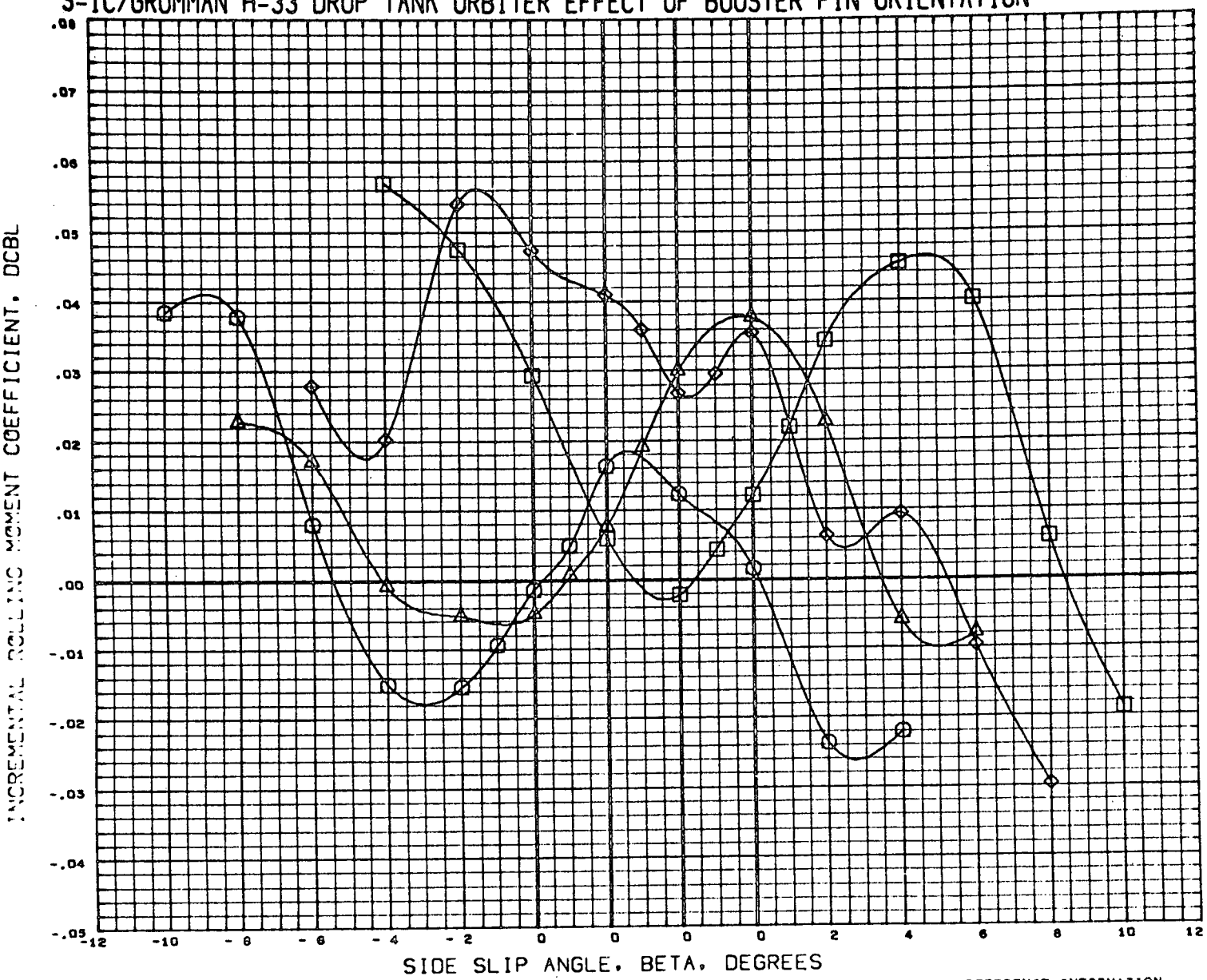


SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	ALPHA	0.000	PHI	90.000
△	3.900				
◇	4.960				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



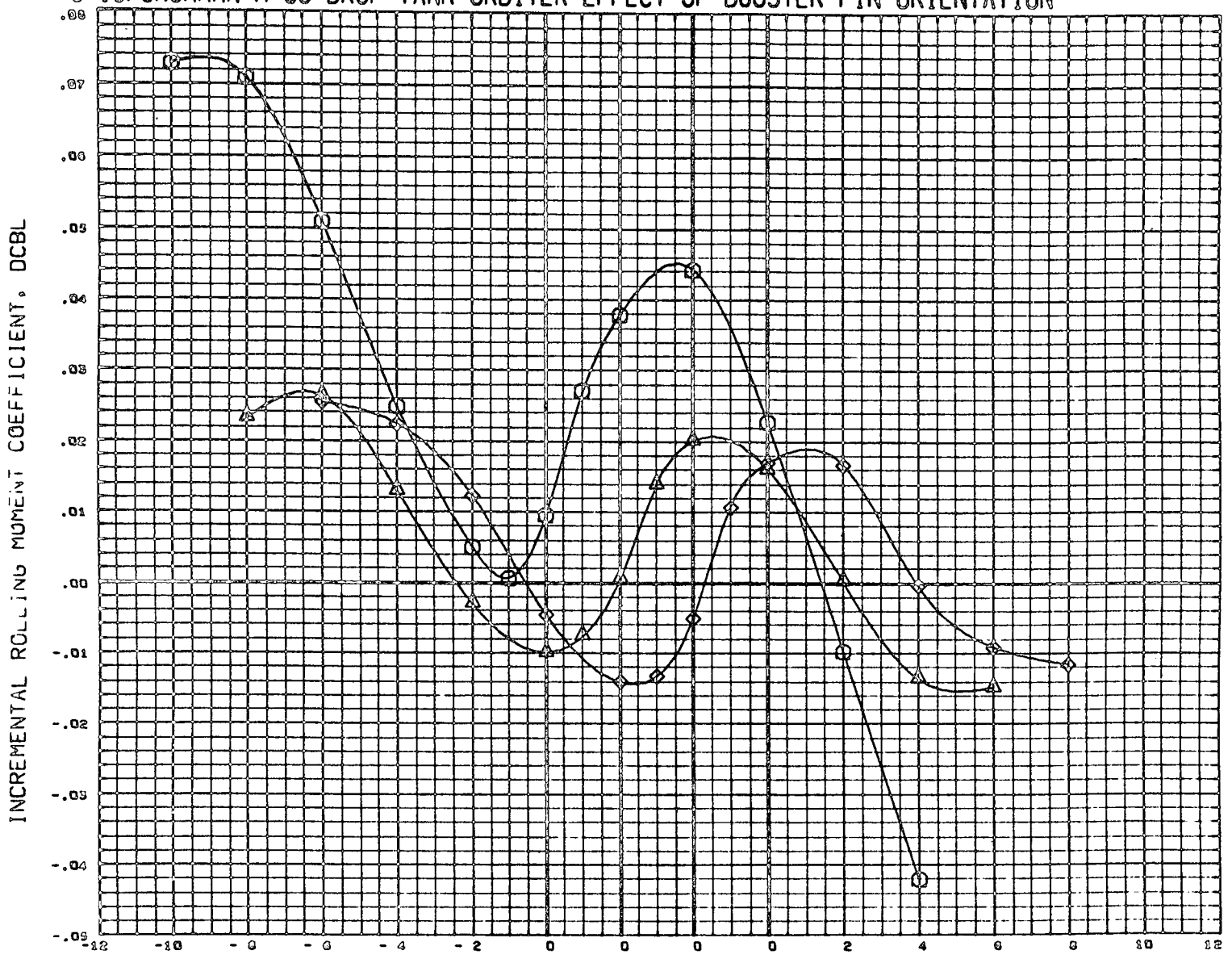
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.600	ALPHA	0.000	PHI	90.000
△	0.900				
◇	1.000				
□	1.200				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



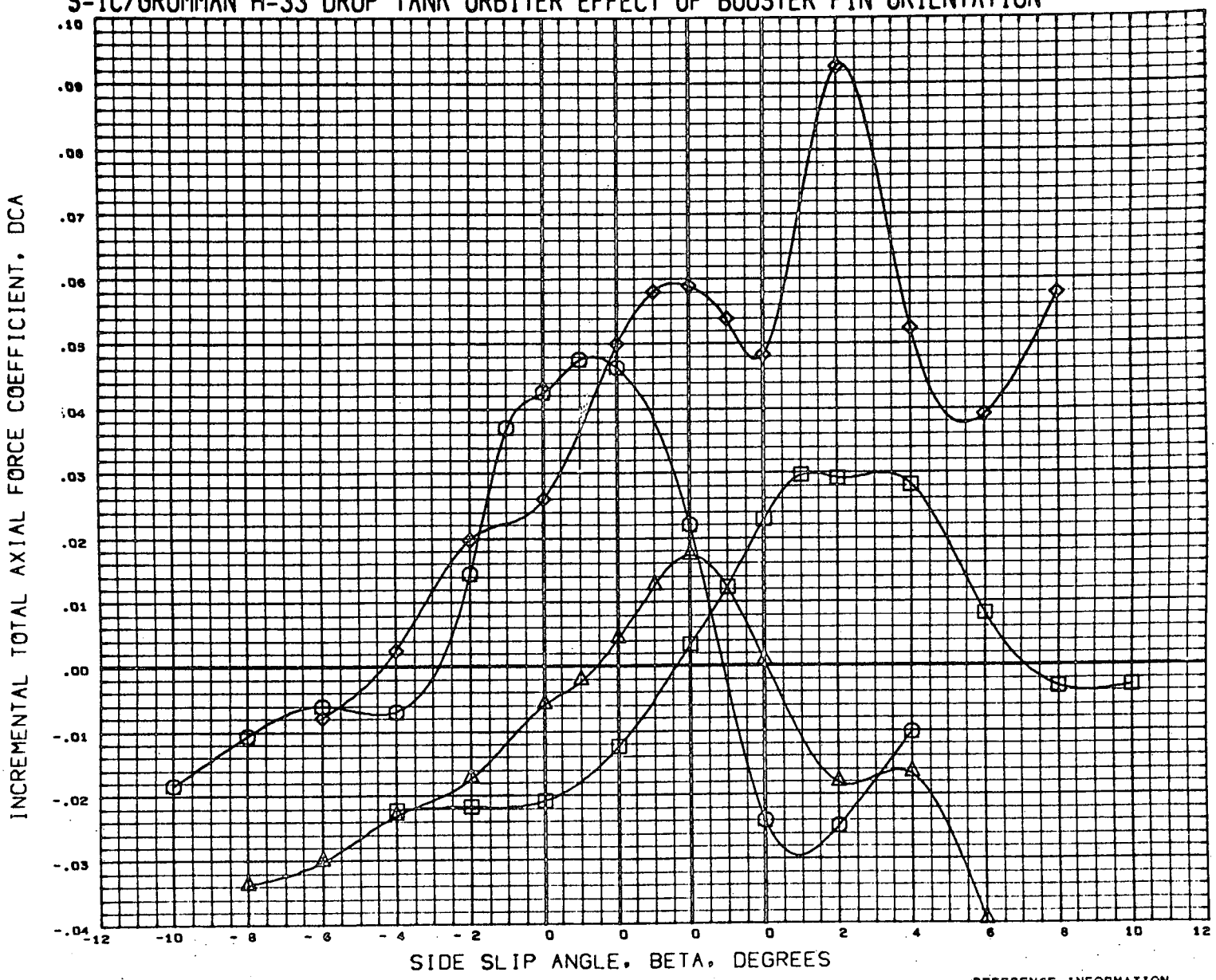
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	ALPHA	0.000	PHI	90.000
△	3.900				
◇	4.960				

DATA MIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	9.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



SYMBOL	MACH
○	0.600
△	0.900
◇	1.000
□	1.200

PARAMETRIC VALUES

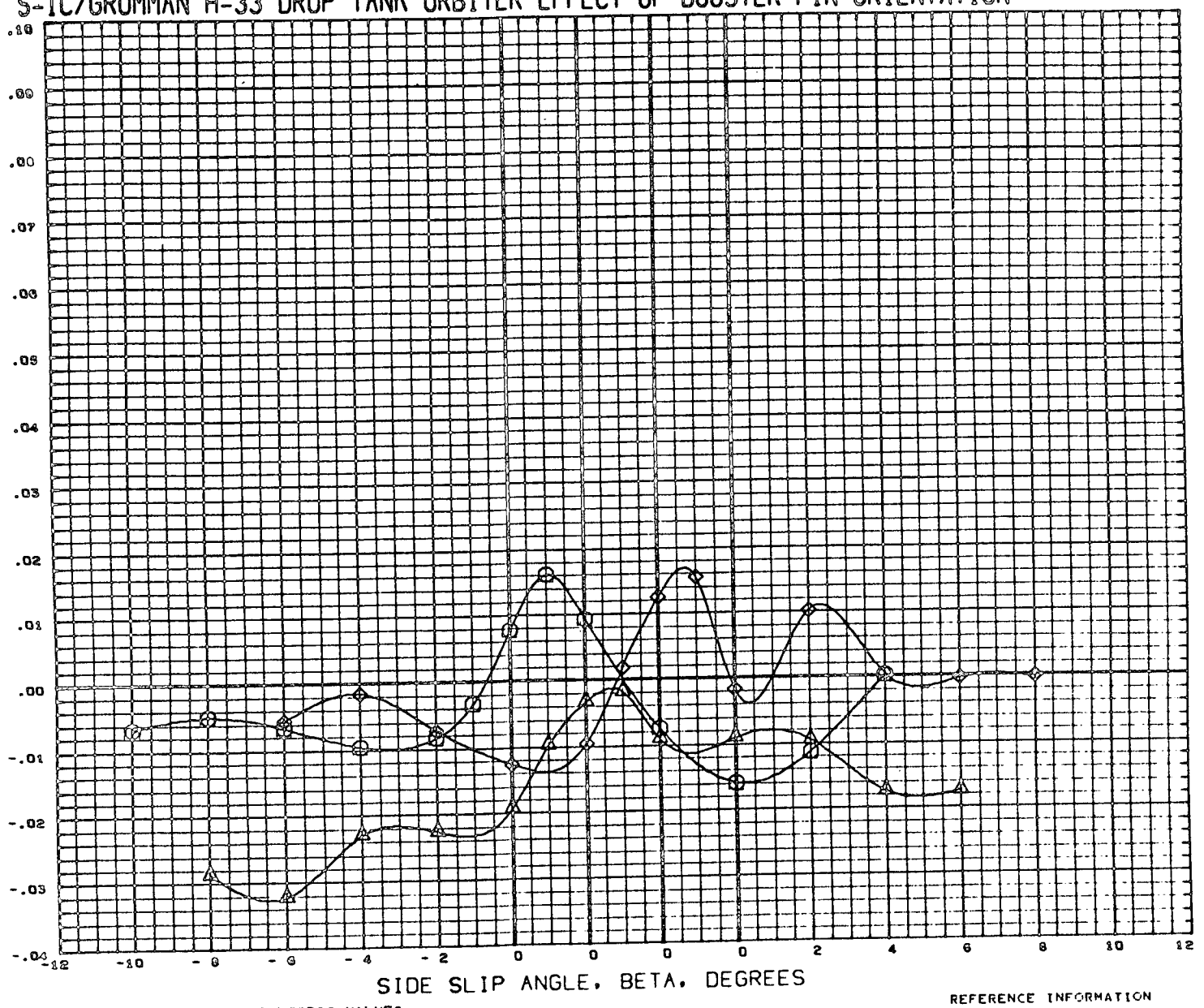
ALPHA 0.000 PHI 90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



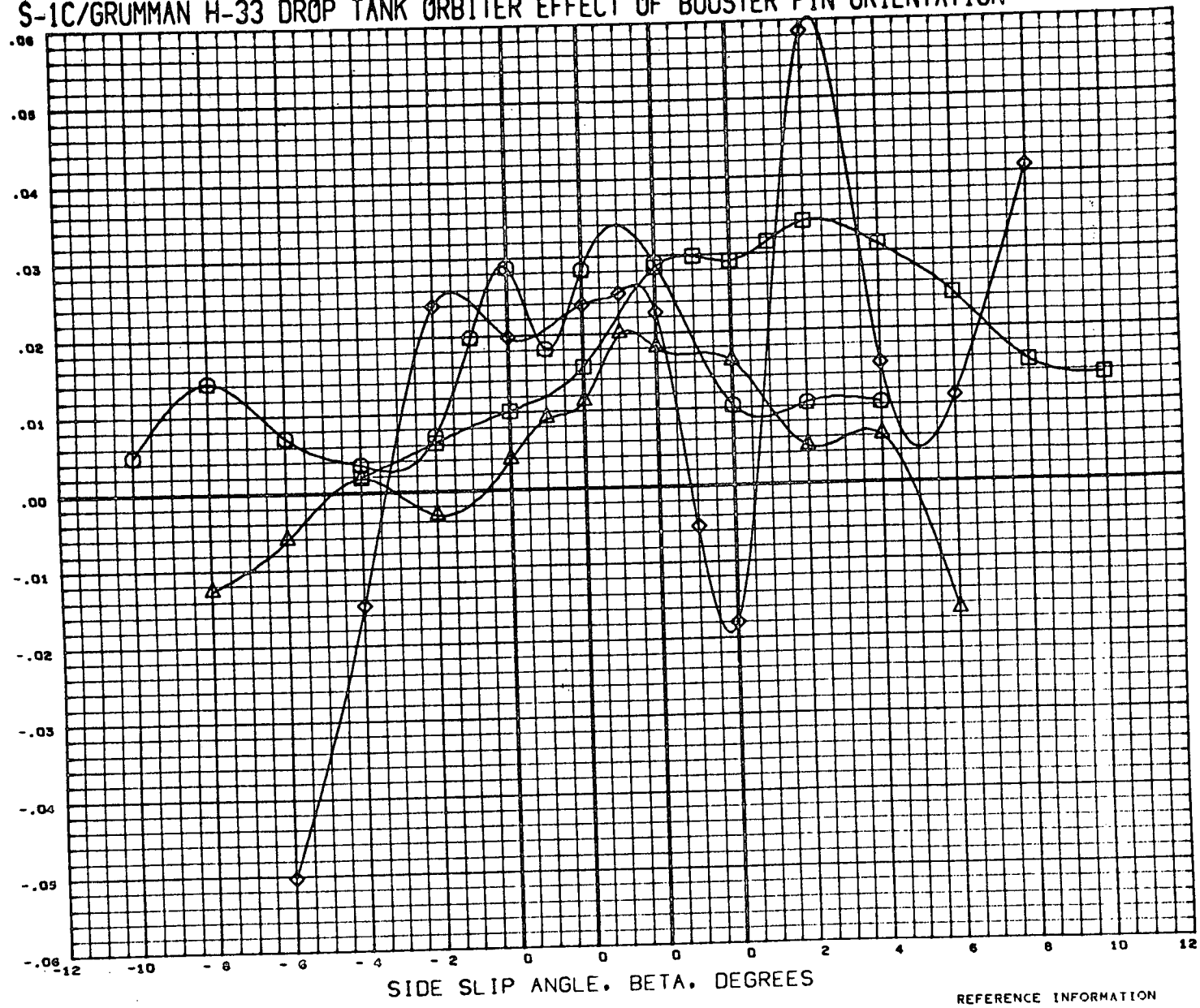
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.960	ALPHA	0.000	PHI	90.000
△	3.500				
◇	4.960				

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



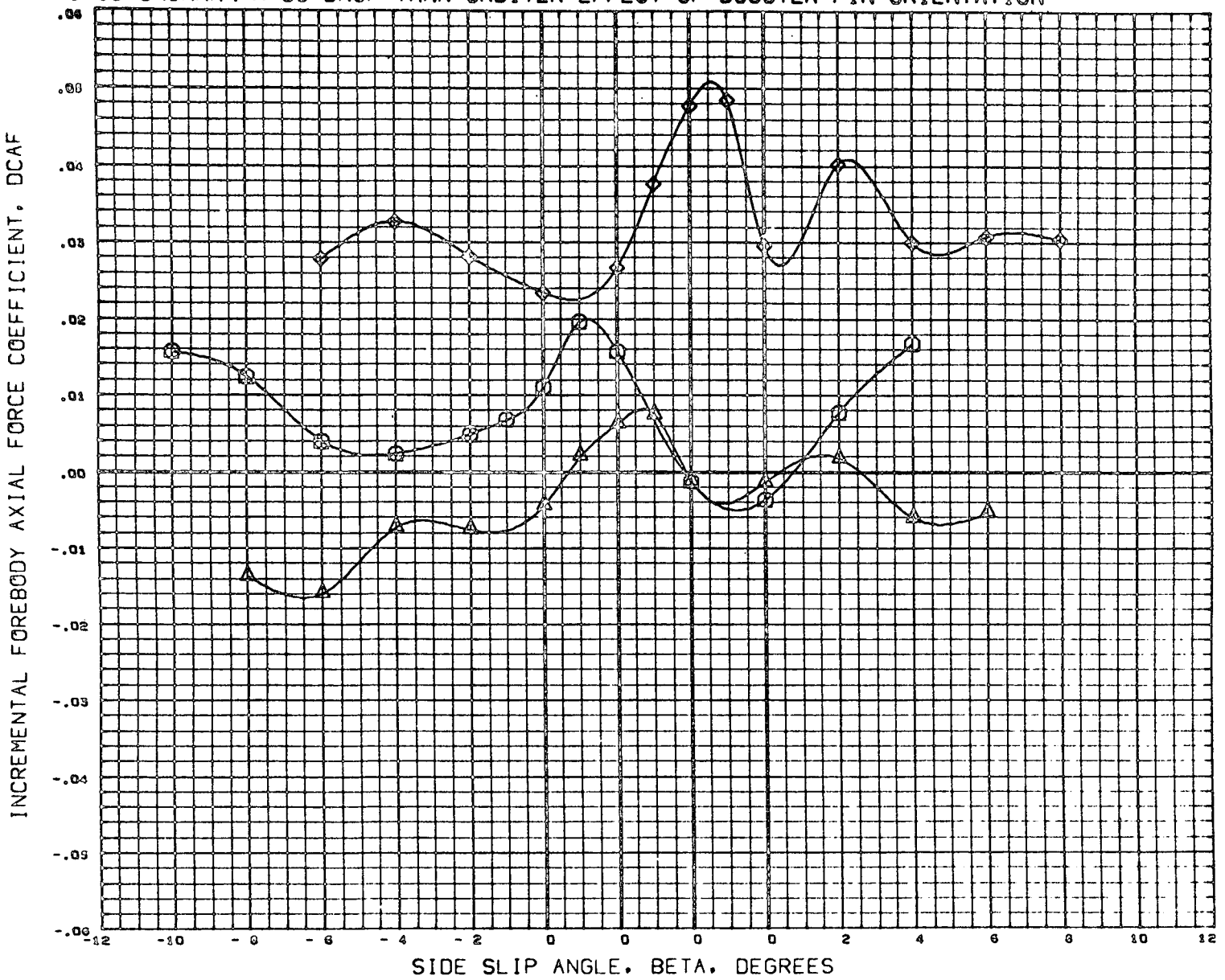
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.600	ALPHA	0.000	PHI	90.000
△	0.900				
◇	1.000				
□	1.200				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



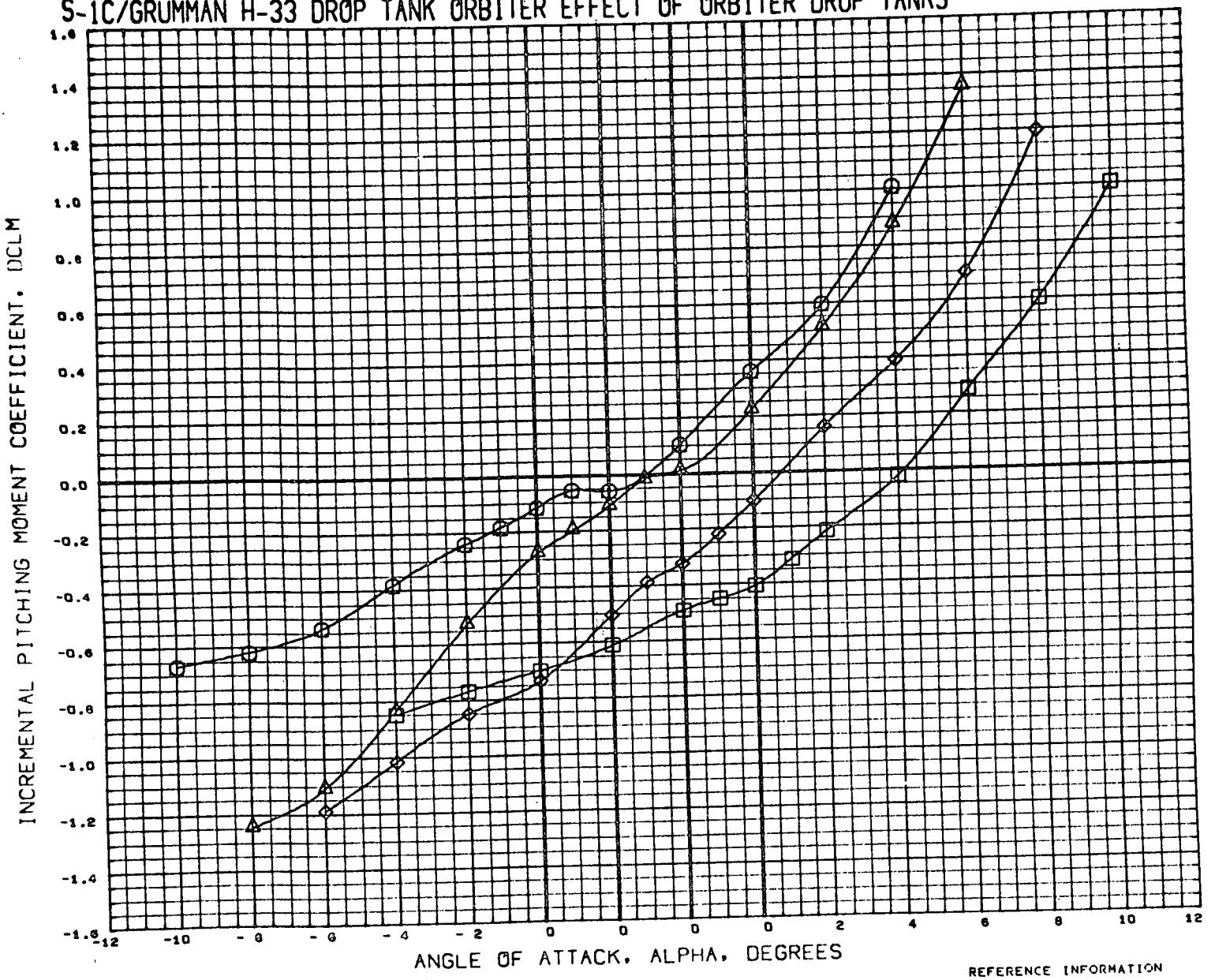
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	ALPHA	0.000	PHI	90.000
△	3.900				
◇	4.960				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



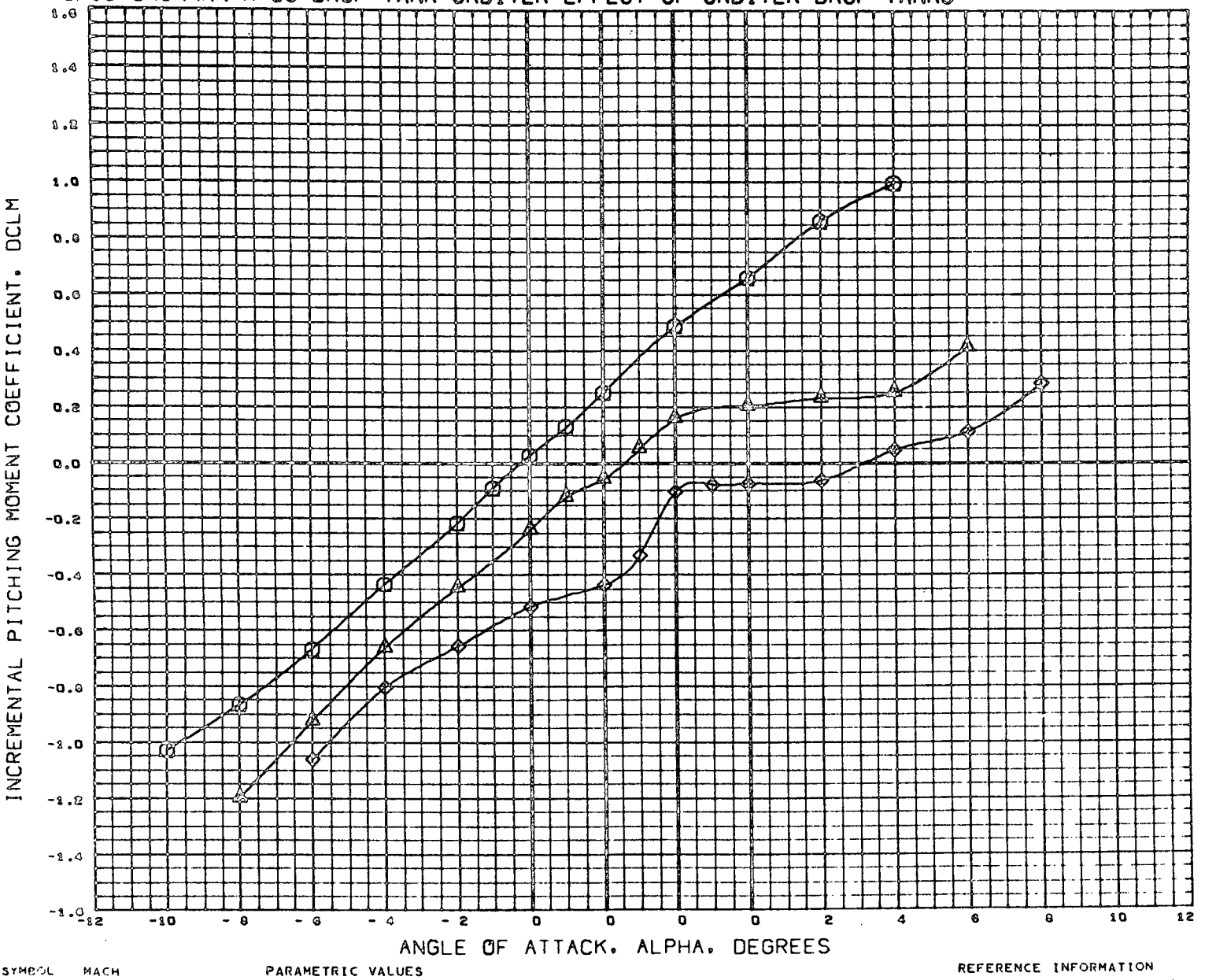
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	BETA	0.000	PHI	0.000
△	1.000				
◇	1.100				
□	1.200				

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



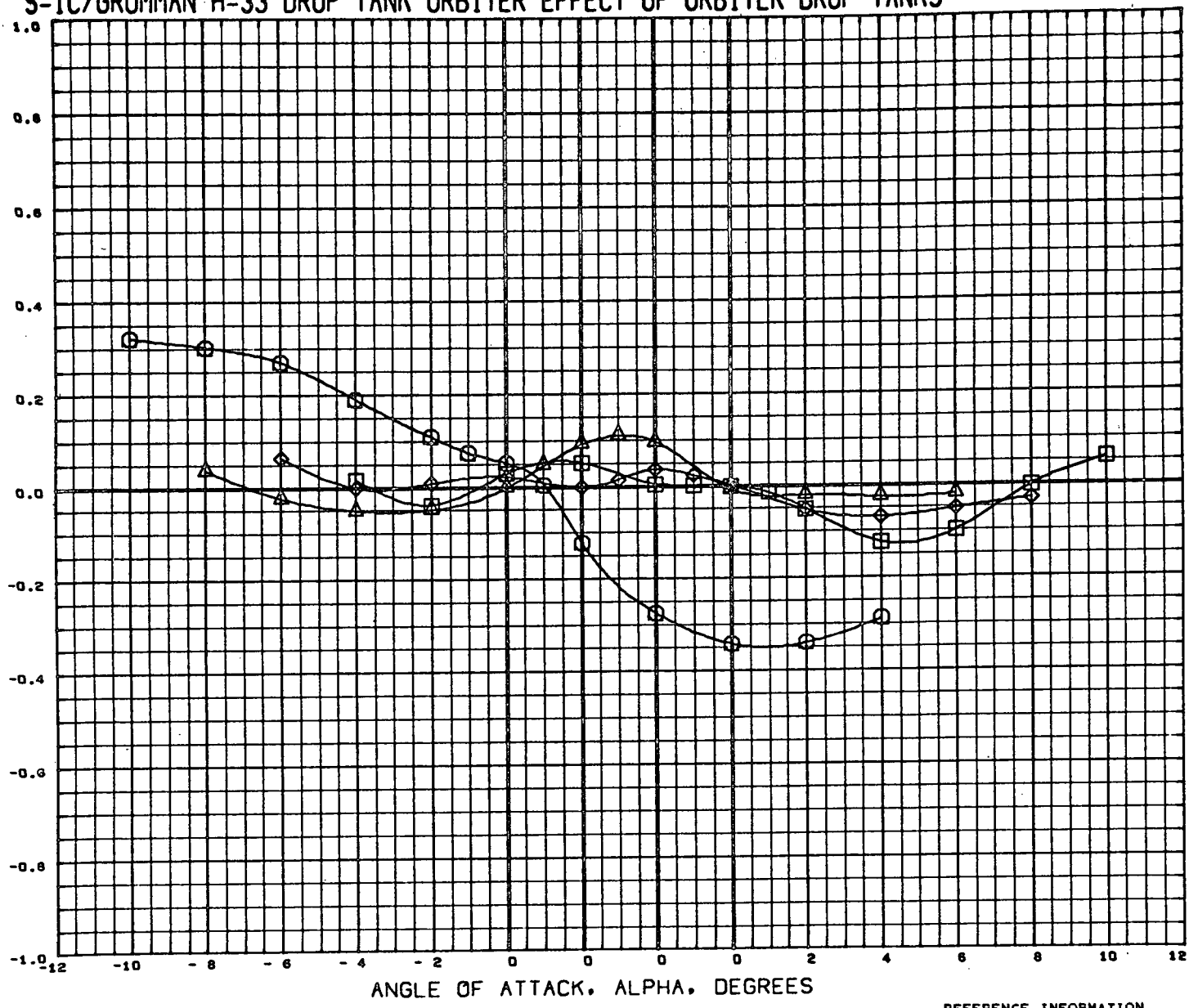
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	BETA	0.000	PHI	0.000
△	3.900				
◇	4.960				

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



SYMBOL	MACH
○	0.900
△	1.000
◇	1.100
□	1.200

PARAMETRIC VALUES

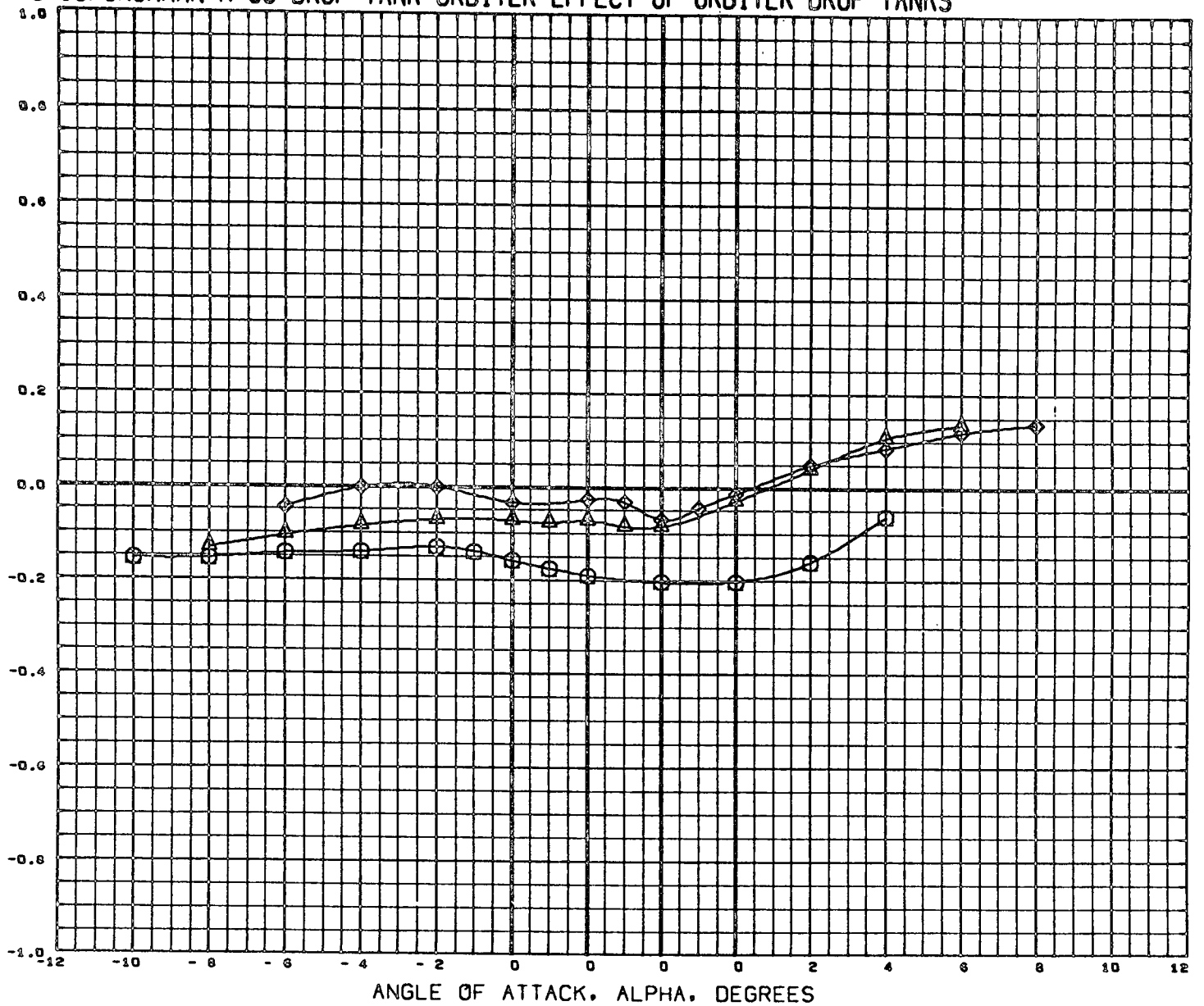
BETA 0.000 PHI 0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



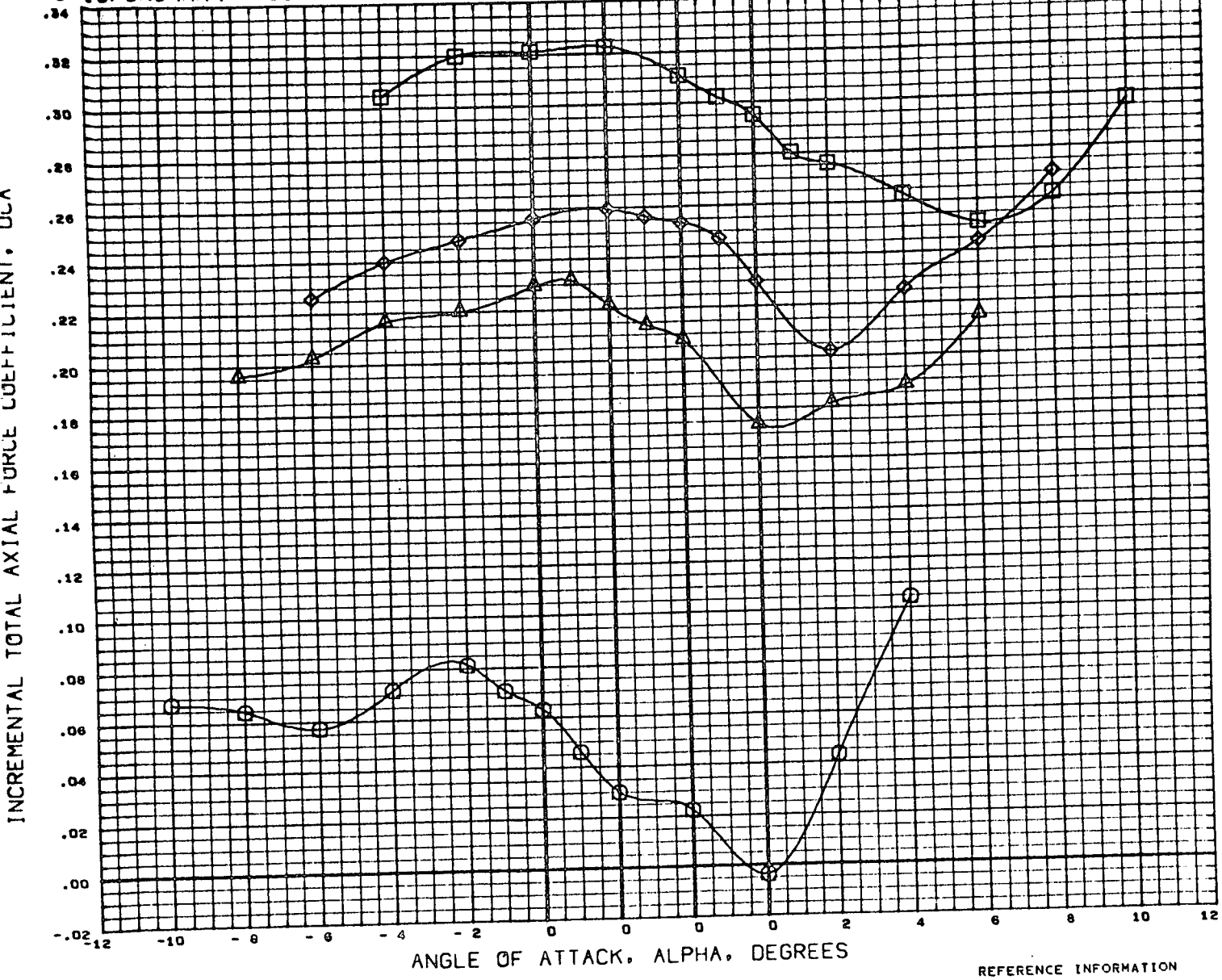
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	BETA	0.000	PHI	0.000
△	3.500				
◇	4.960				

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



SYMBOL	MACH
○	0.900
△	1.000
◇	1.100
□	1.200

PARAMETRIC VALUES

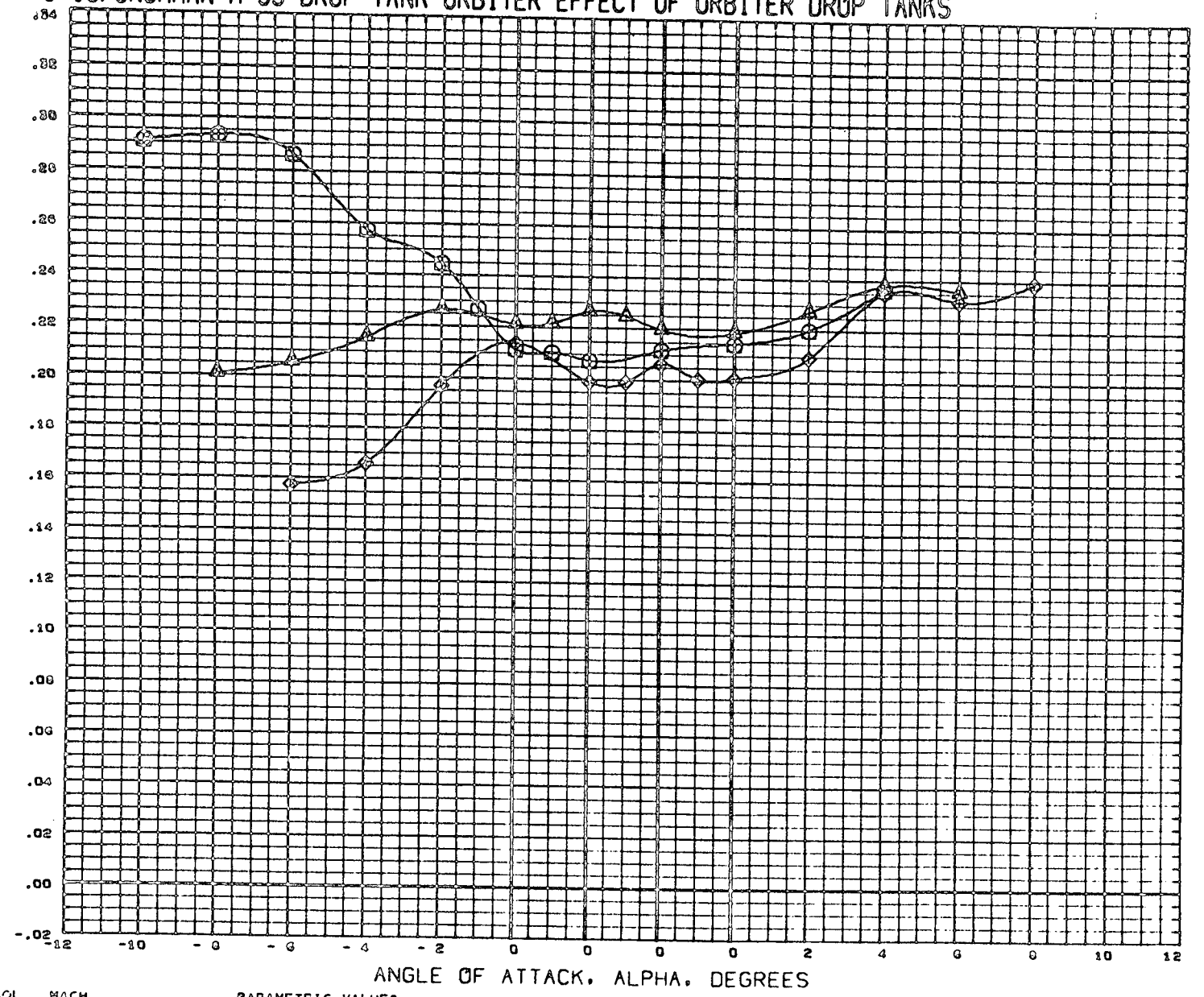
BETA 0.000 PHI 0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

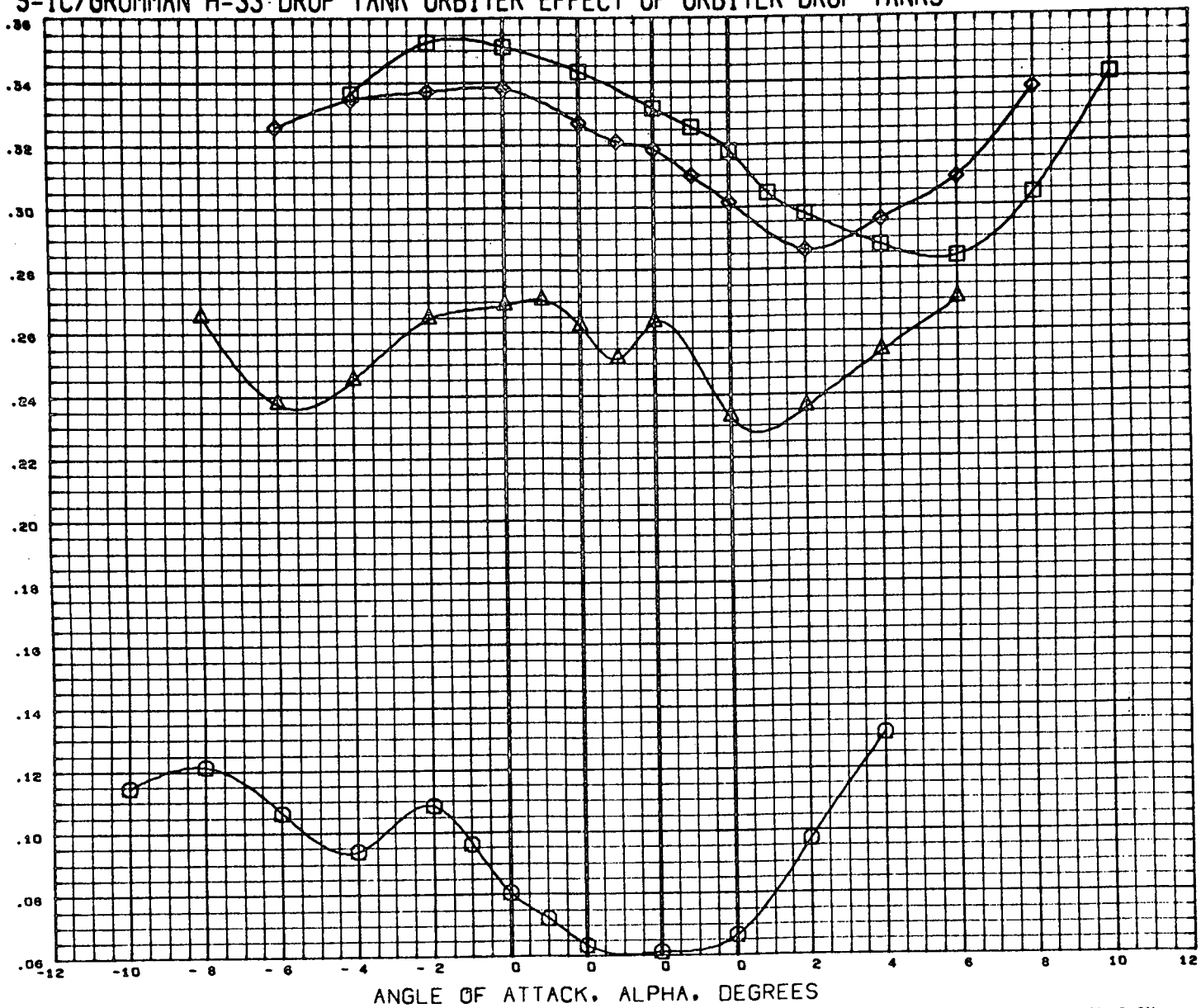


SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	BETA	0.000	PHI	0.000
△	3.900				
◇	4.960				

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



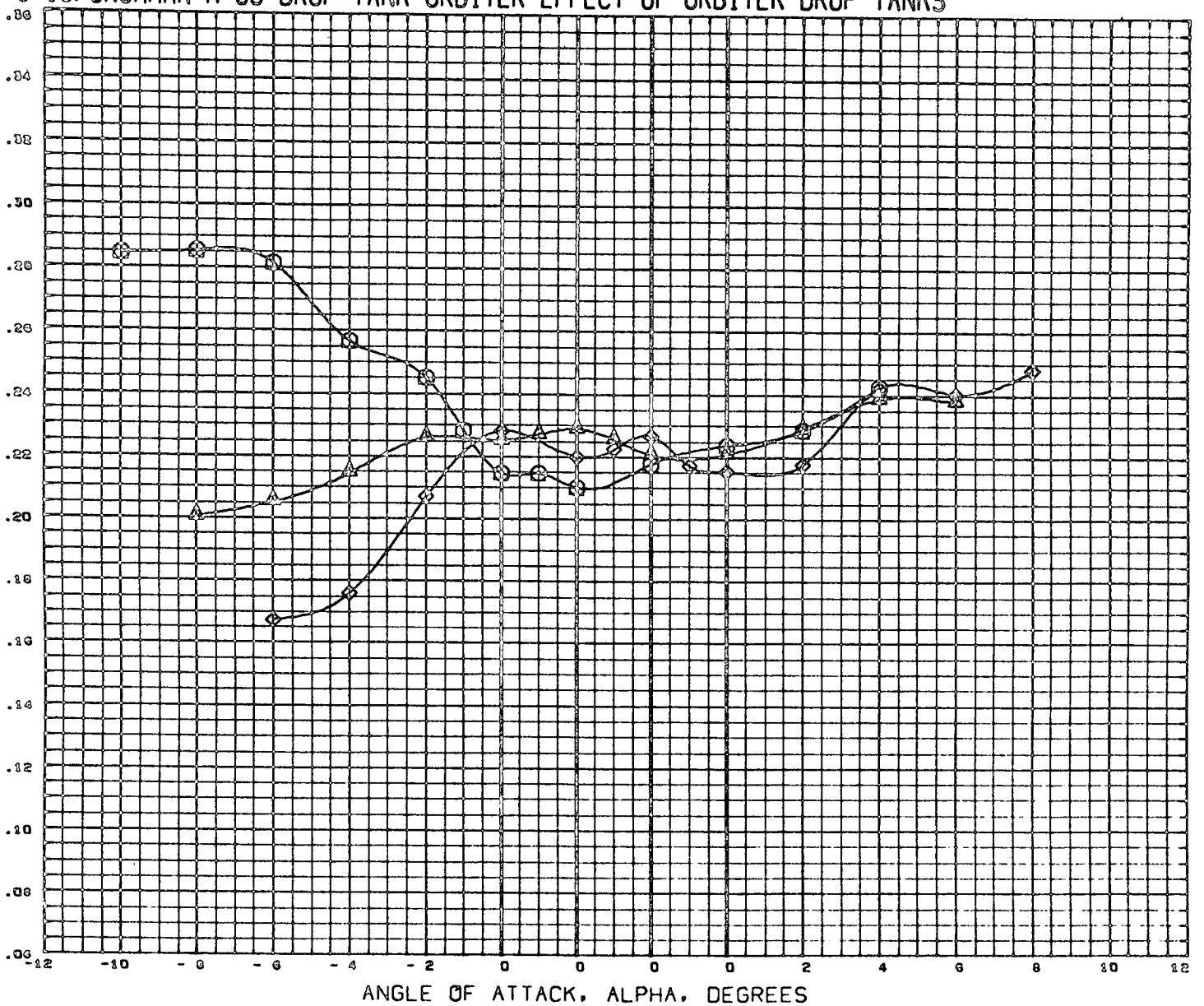
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.900	BETA	0.000	PHI	0.000
△	1.000				
◇	1.100				
□	1.200				

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



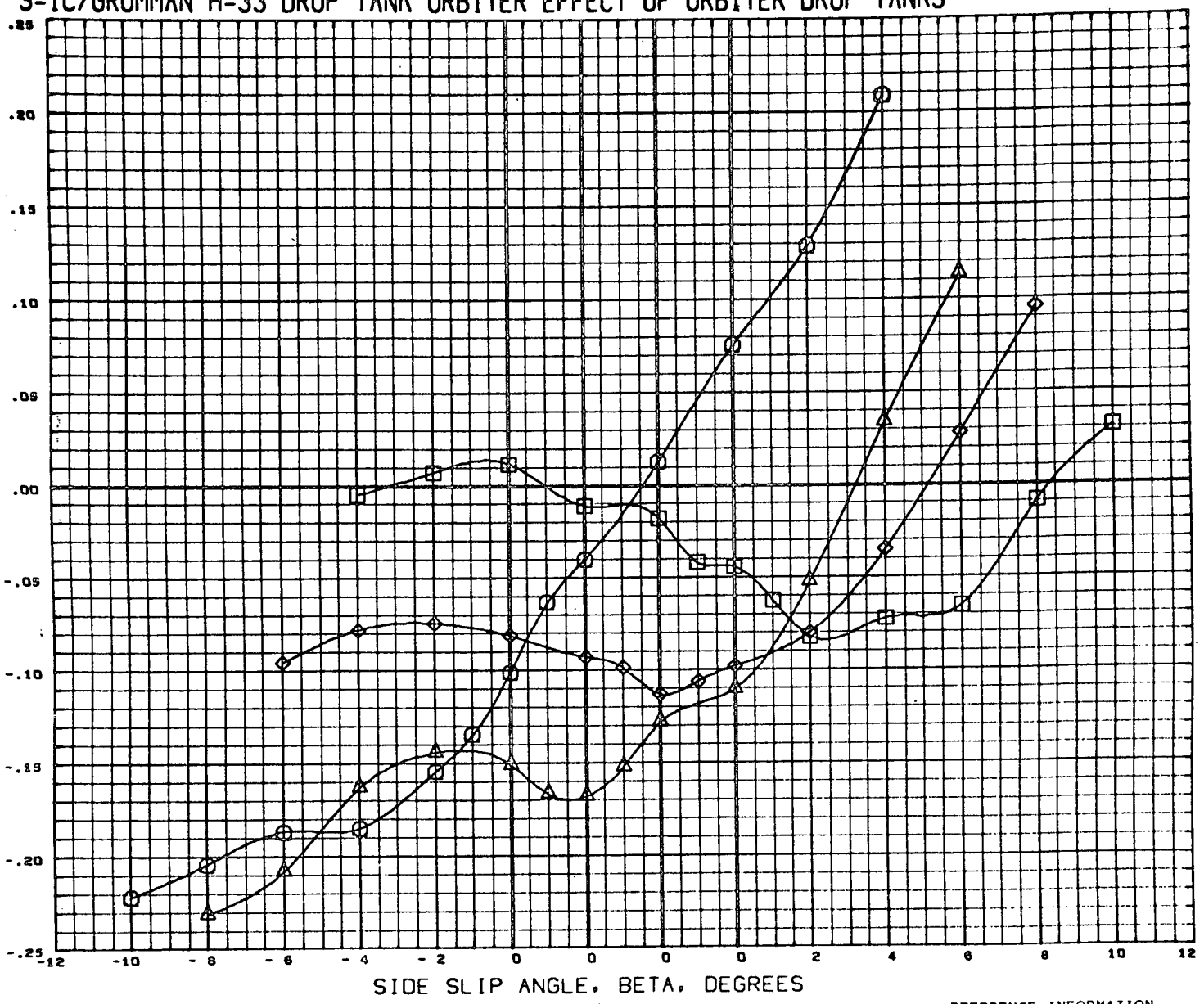
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	BETA	0.000	PHI	0.000
△	3.900				
◇	4.960				

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



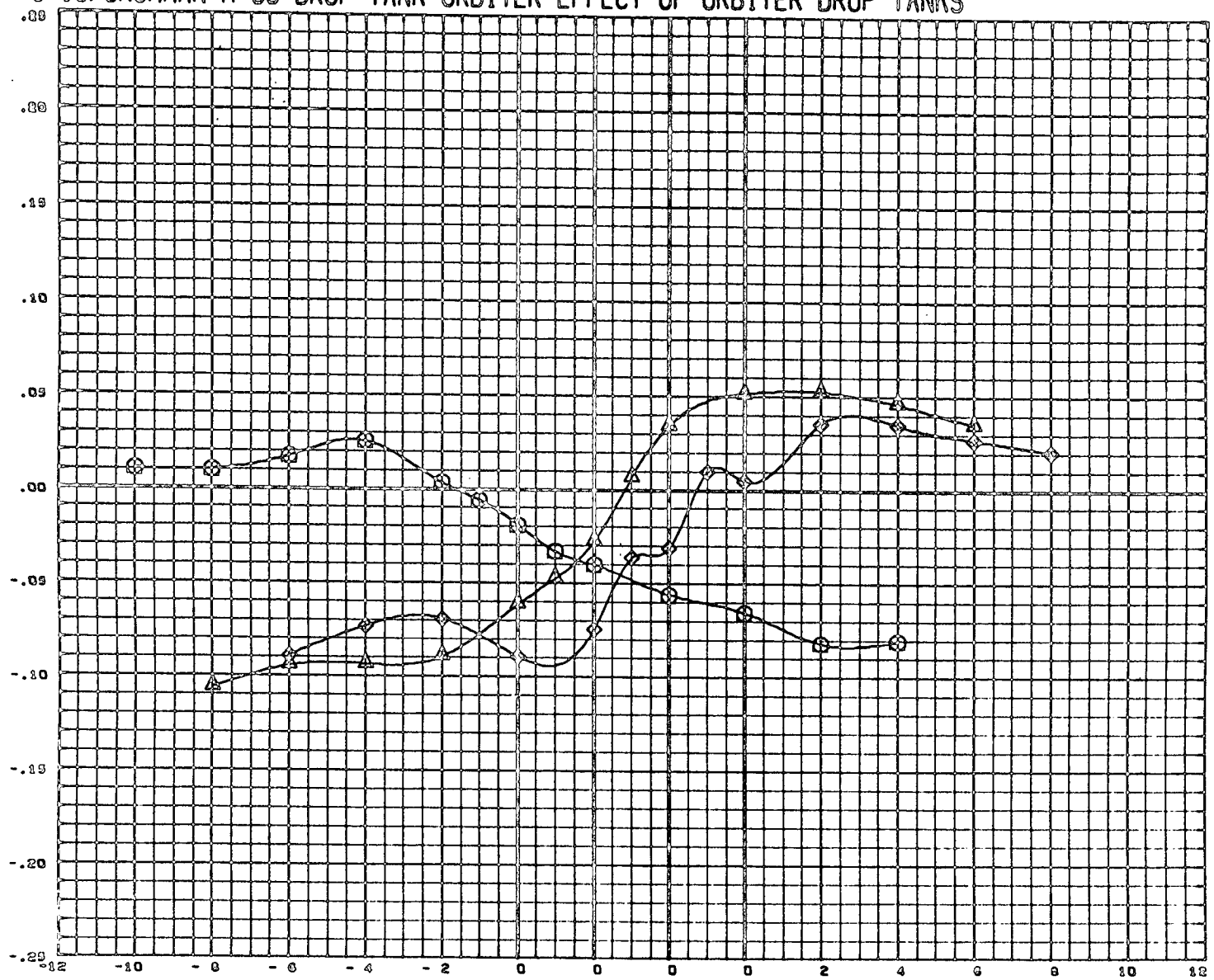
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	ALPHA	0.000	PHI	90.000
△	1.000				
◇	1.100				
□	1.200				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

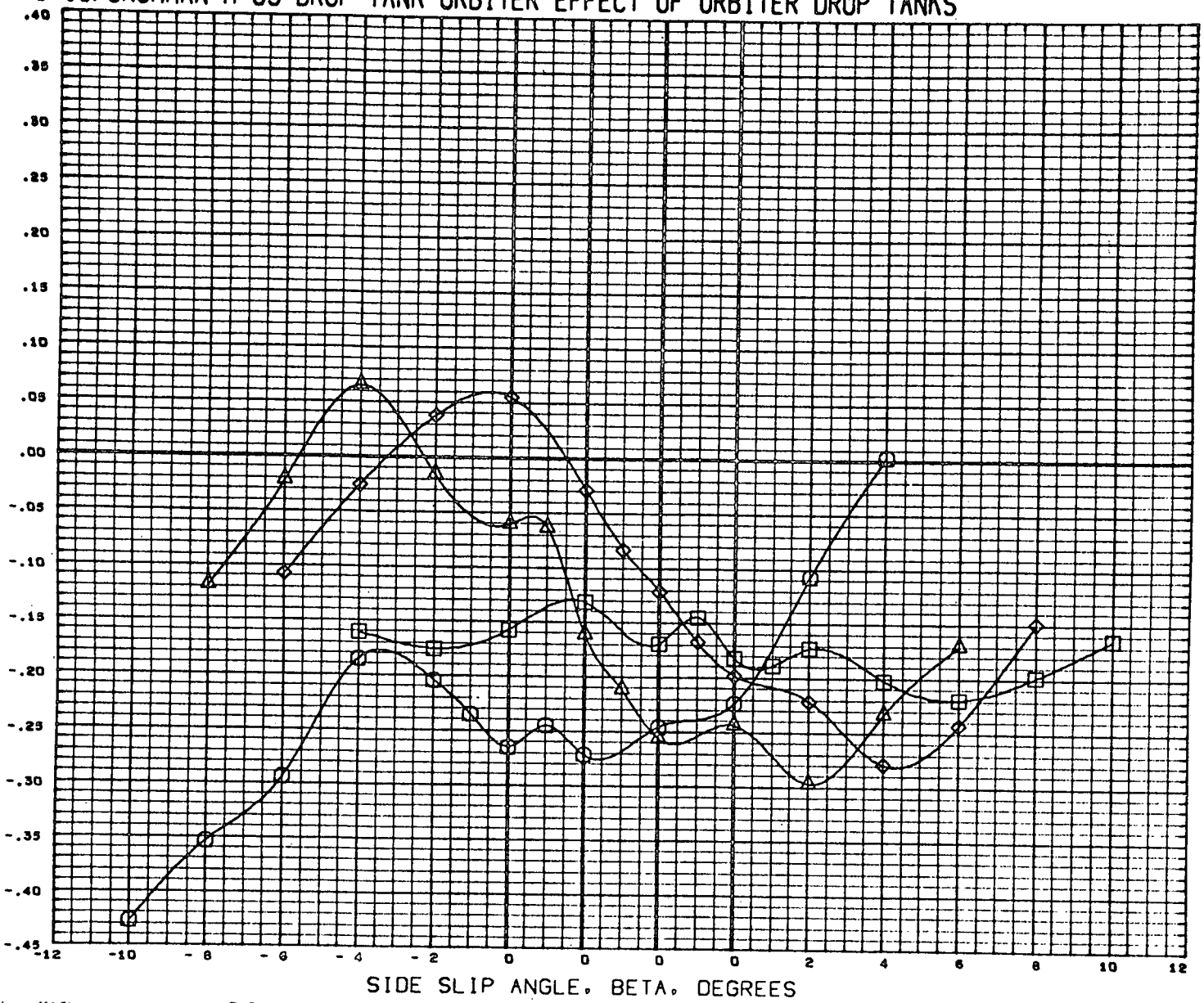


SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	ALPHA	0.000	PHI	90.000
△	3.500				
◇	4.960				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	9.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



SYMBOL	MACH
○	0.900
△	1.000
◇	1.100
□	1.200

PARAMETRIC VALUES

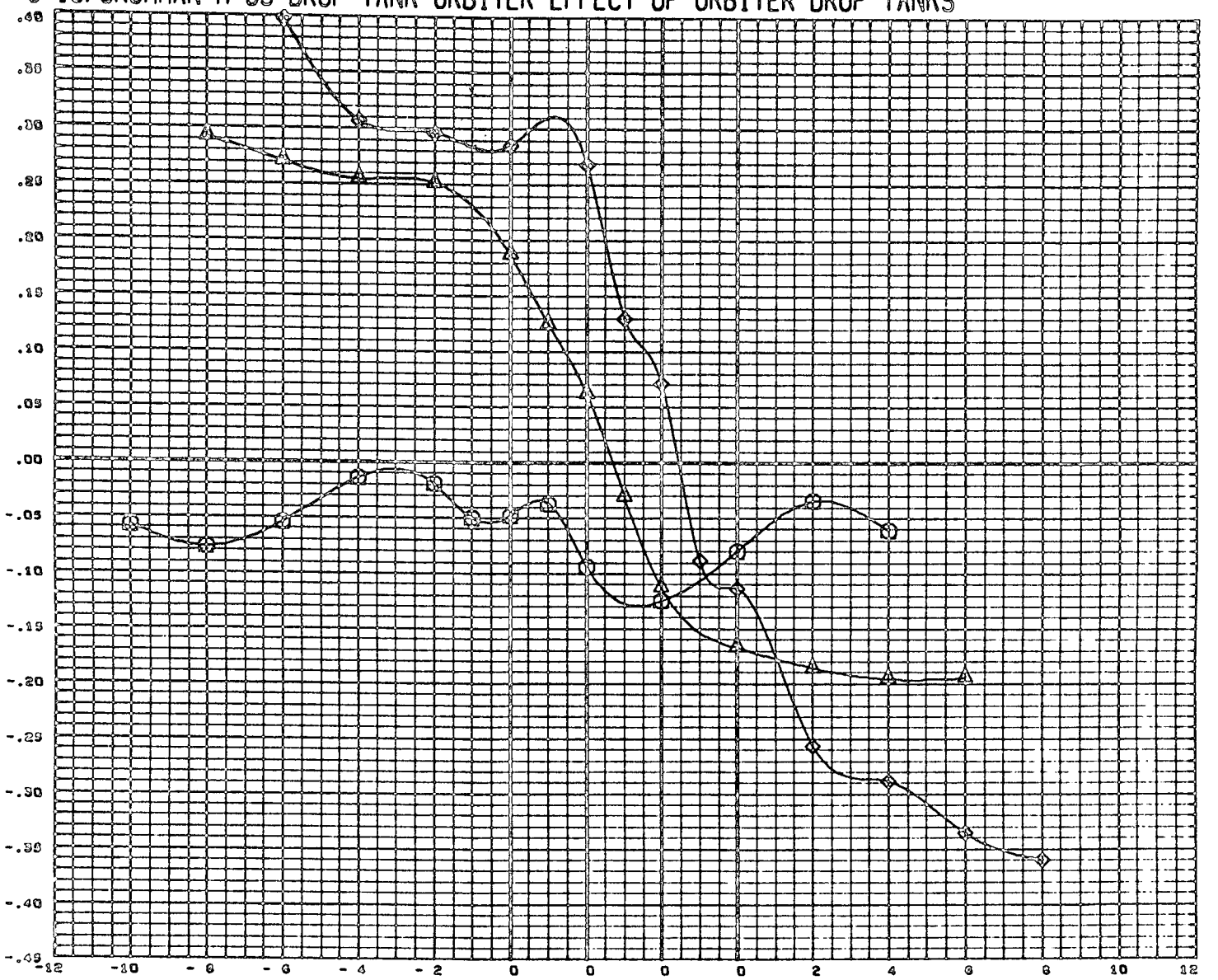
ALPHA 0.000 PHI 90.000

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



INCREMENTAL YAWING MOMENT COEFFICIENT, DCYN

SIDE SLIP ANGLE, BETA, DEGREES

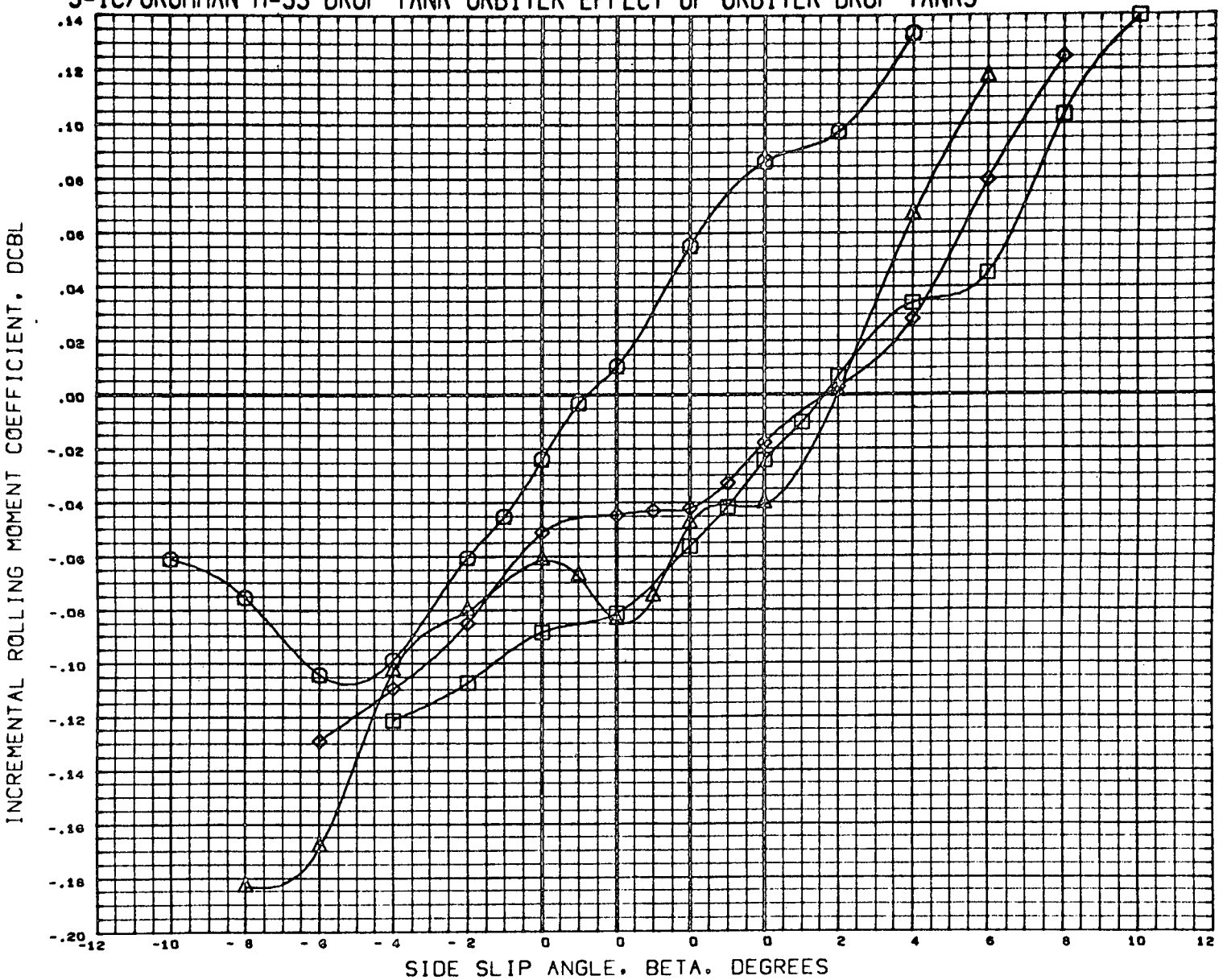
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	ALPHA	0.000	PHI	90.000
△	3.900				
◇	4.900				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



SYMBOL	MACH
○	0.900
△	1.000
◇	1.100
□	1.200

PARAMETRIC VALUES

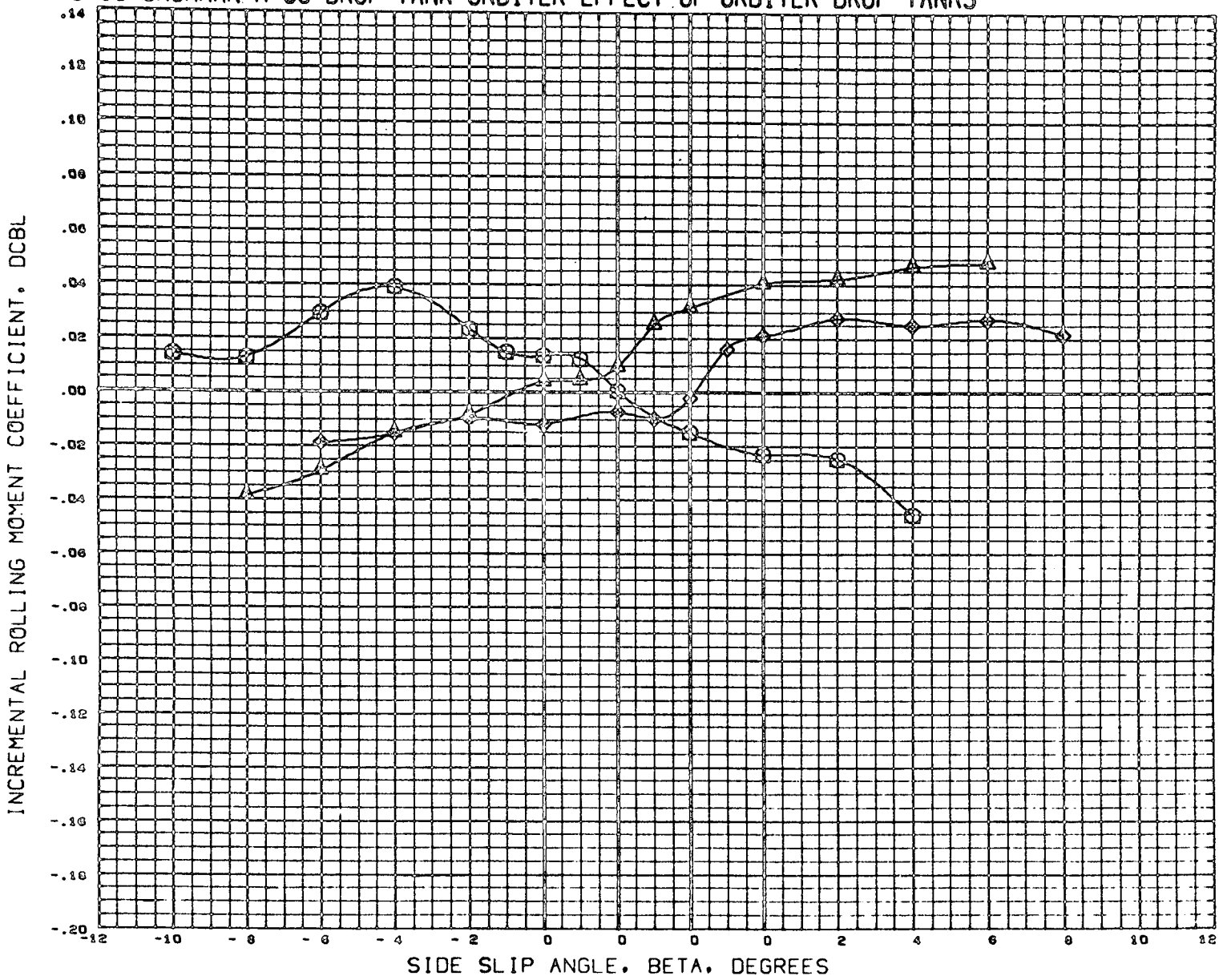
ALPHA 0.000 PHI 90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



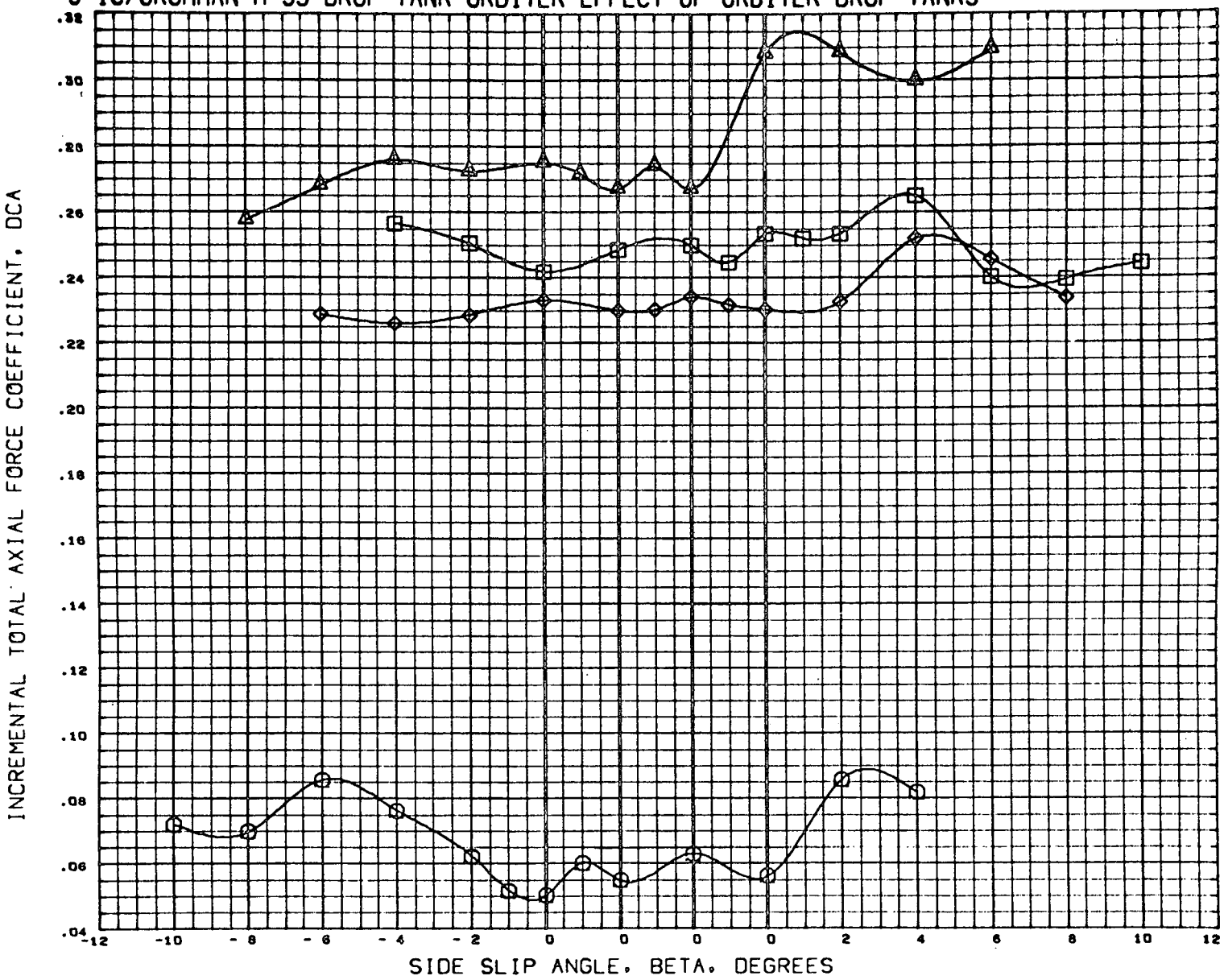
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	ALPHA	0.000	PHI	90.000
△	3.500				
◇	4.960				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



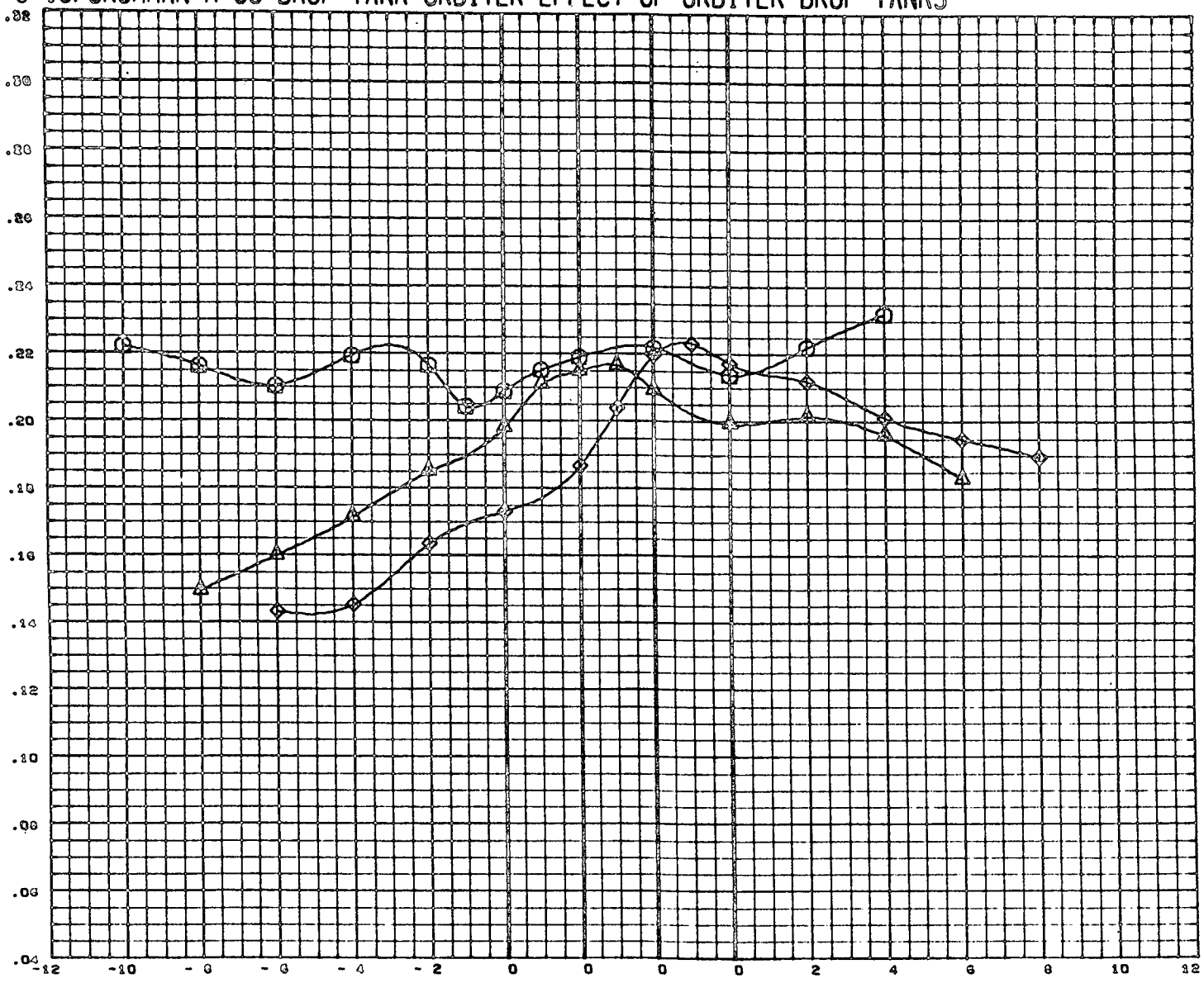
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	ALPHA	0.000	PHI	90.000
△	1.000				
◇	1.100				
□	1.200				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

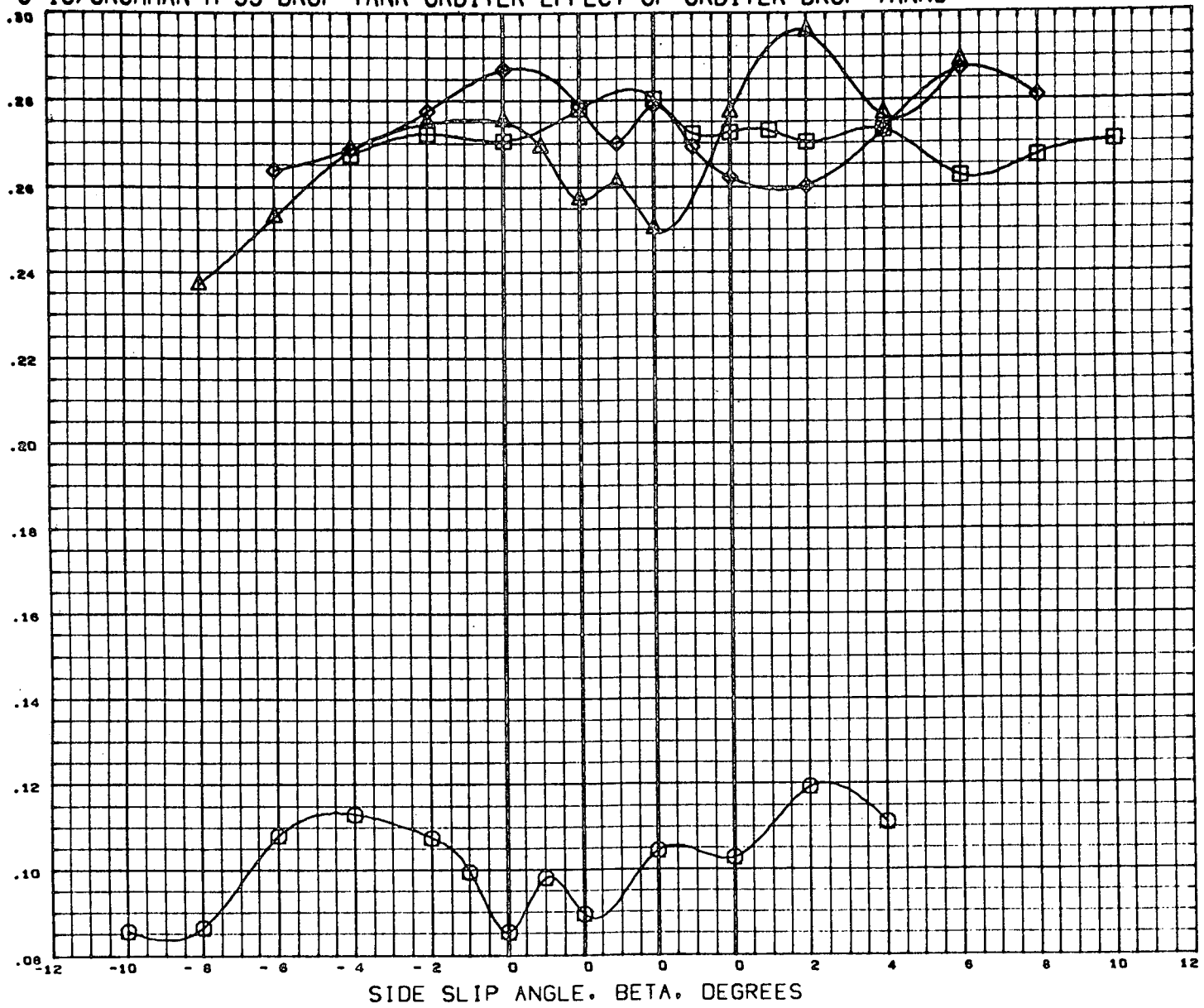


SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	ALPHA	0.000	PHI	90.000
△	3.900				
◇	4.960				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



SYMBOL	MACH
○	0.900
△	1.000
◇	1.100
□	1.200

PARAMETRIC VALUES

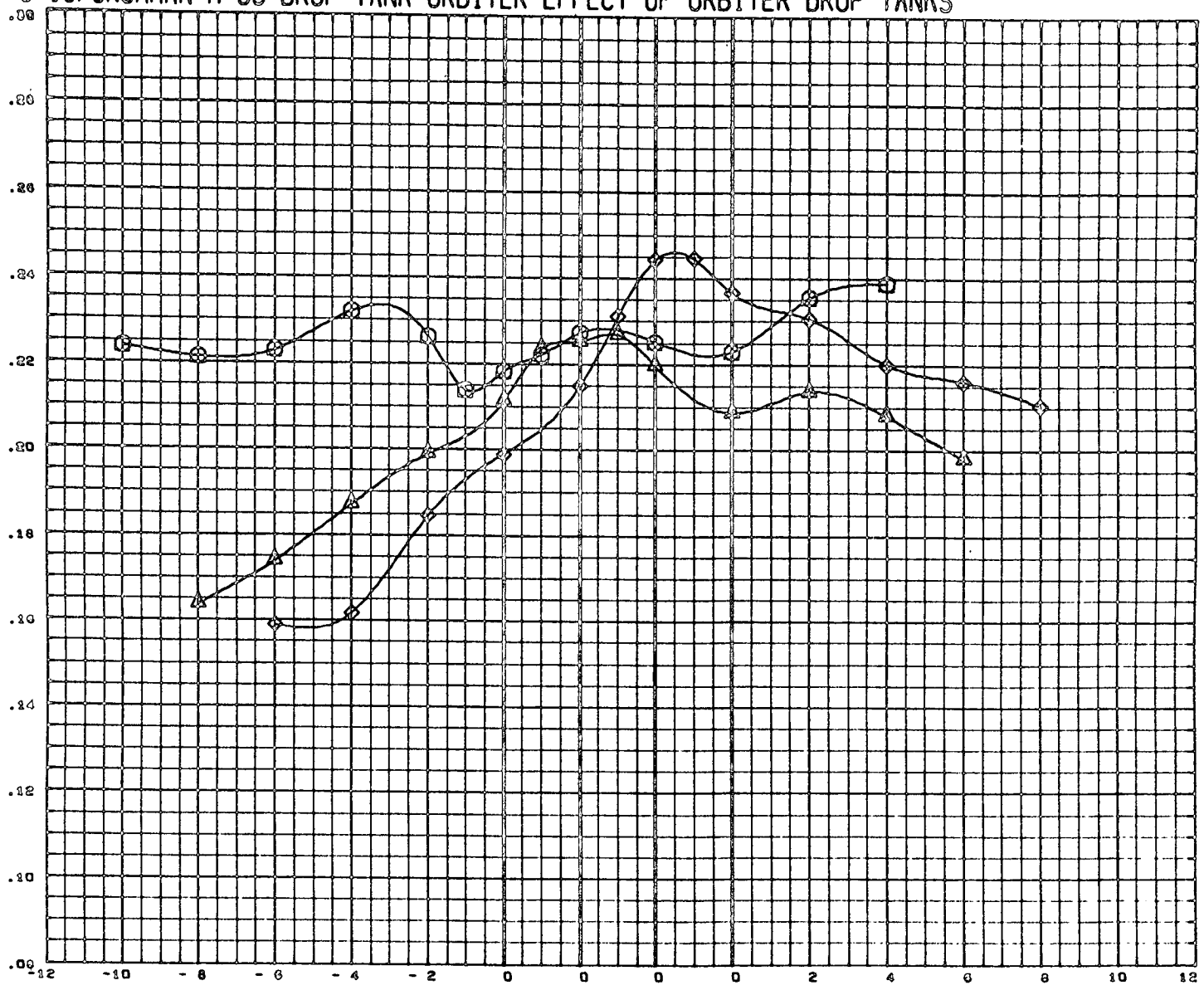
ALPHA 0.000 PHI 90.000

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



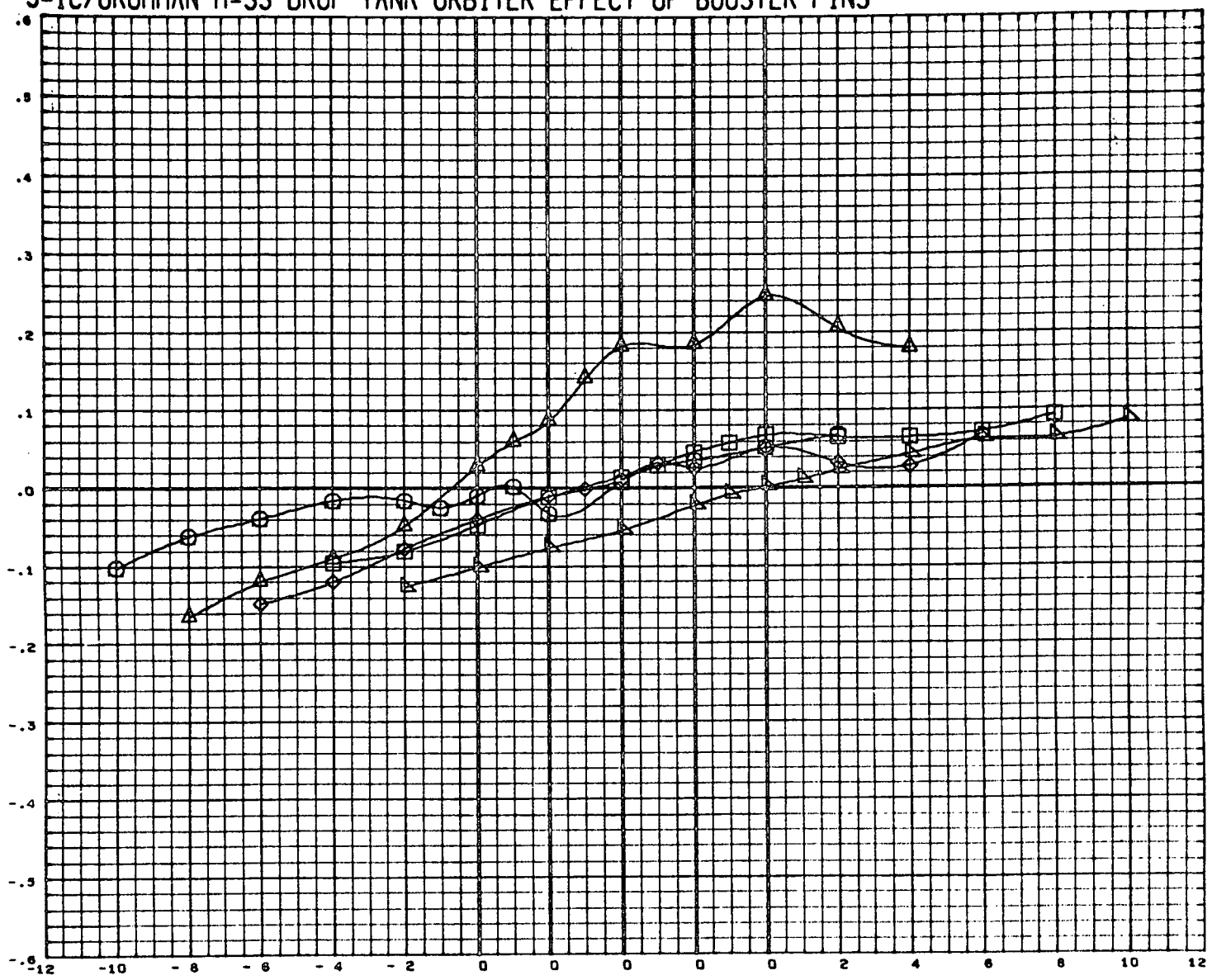
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	ALPHA	0.000	PHI	90.000
△	3.900				
◇	4.960				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



SYMBOL	MACH
○	0.900
△	1.000
◇	1.100
□	1.200
⊠	1.960

PARAMETRIC VALUES

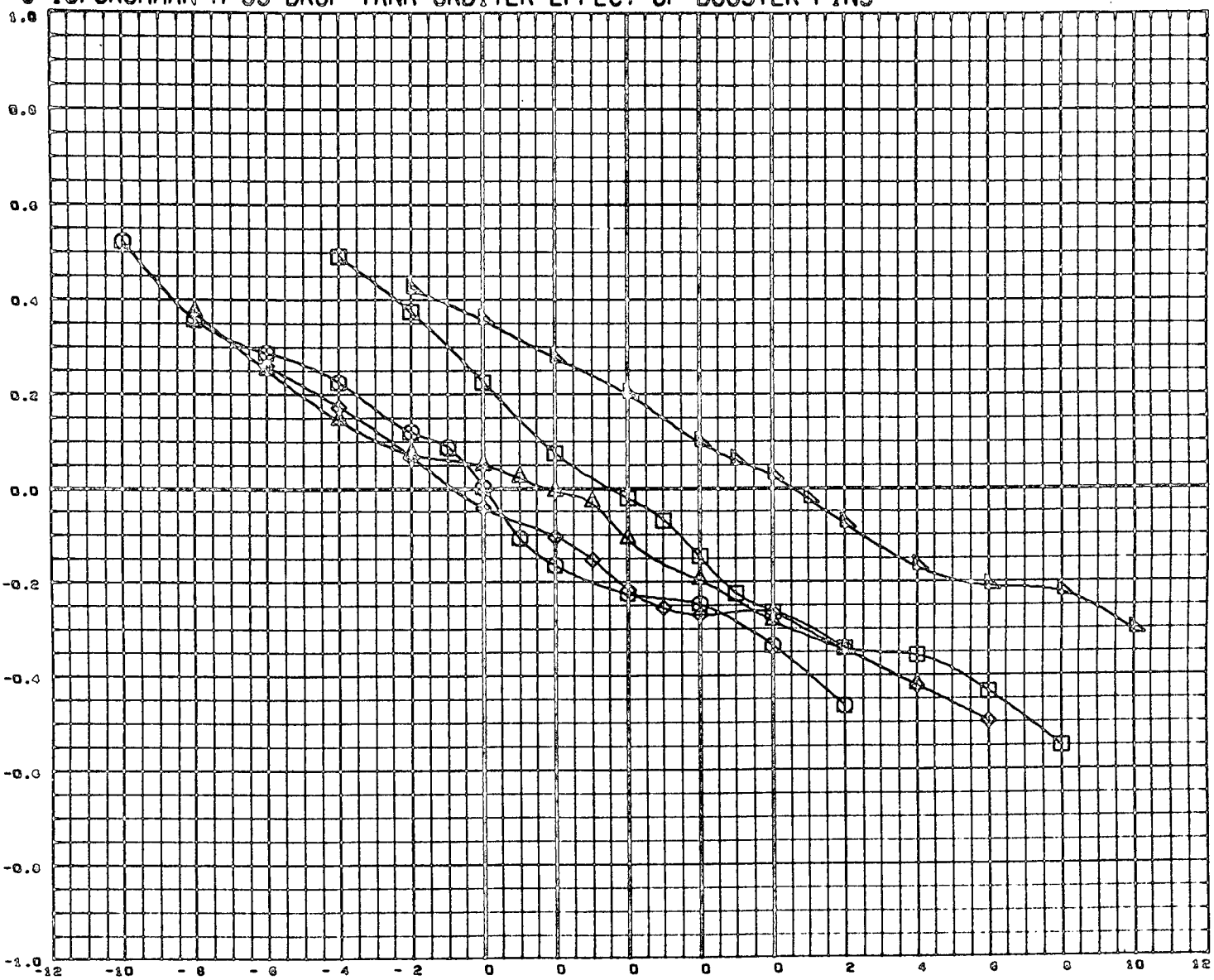
BETA 0.000 PHI 0.000

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



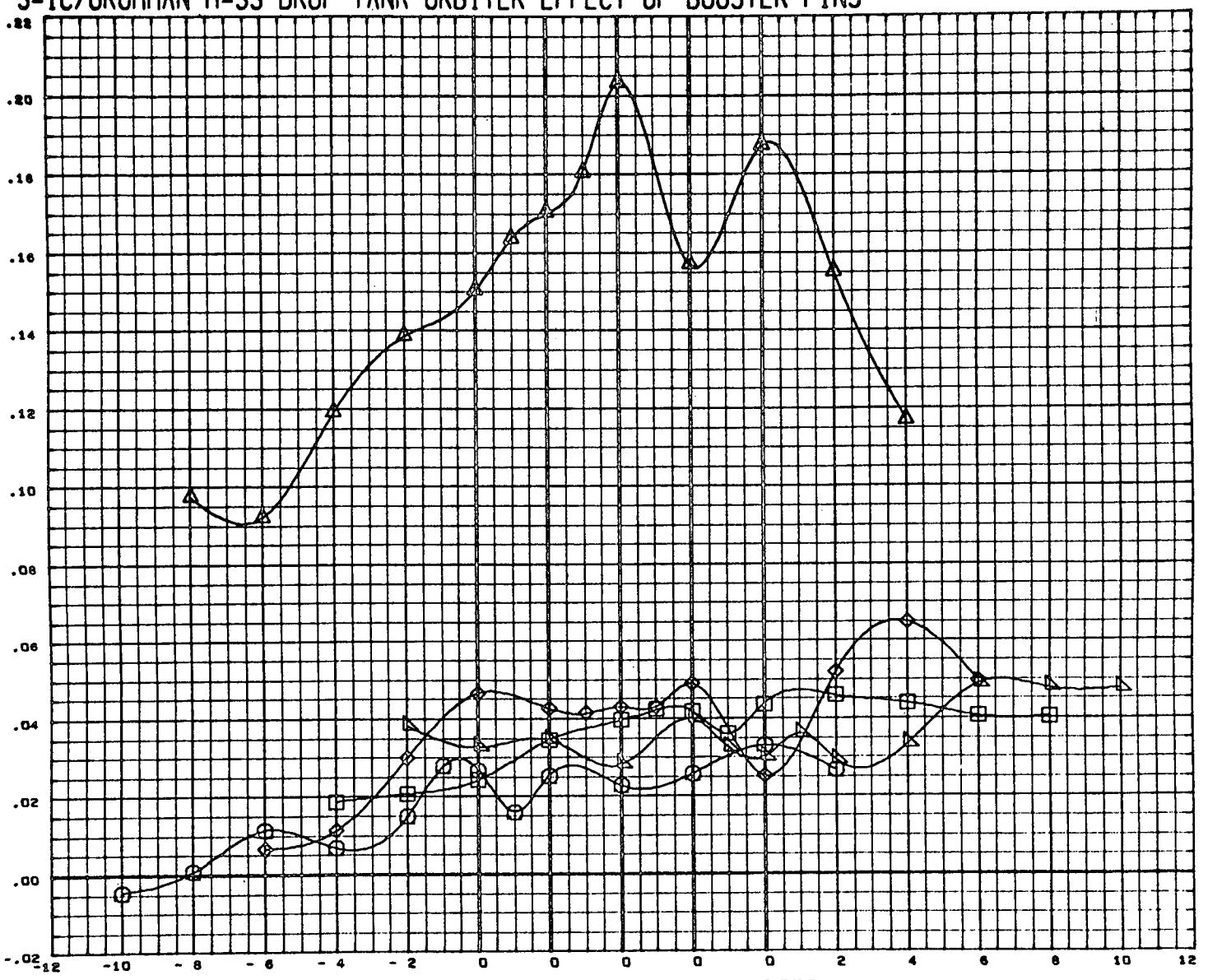
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	BETA	0.000	PHI	0.000
△	1.000				
◇	1.100				
□	1.200				
⟋	1.000				

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



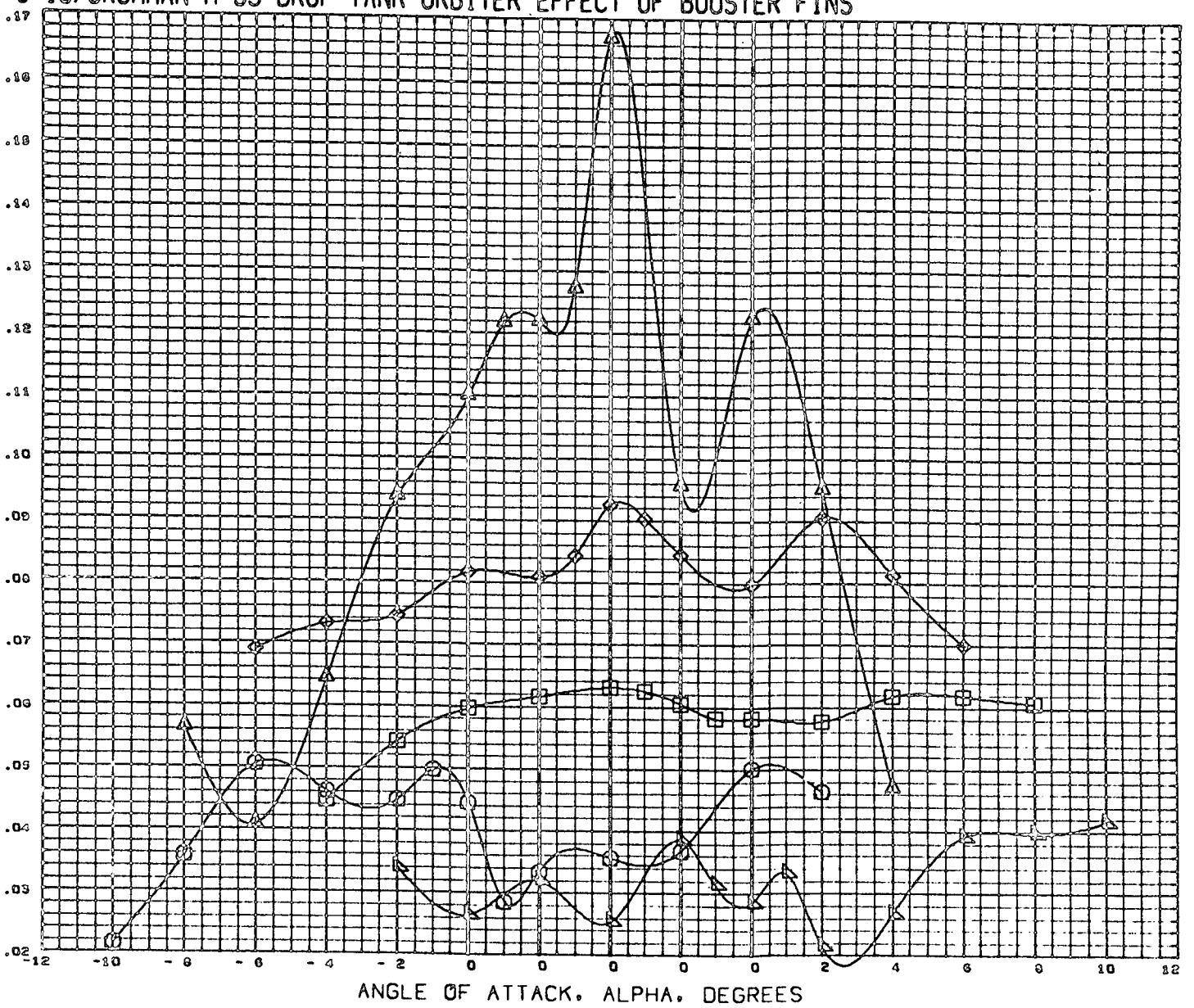
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	BETA	0.000	PHI	0.000
△	1.000				
◇	1.100				
□	1.200				
▽	1.960				

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



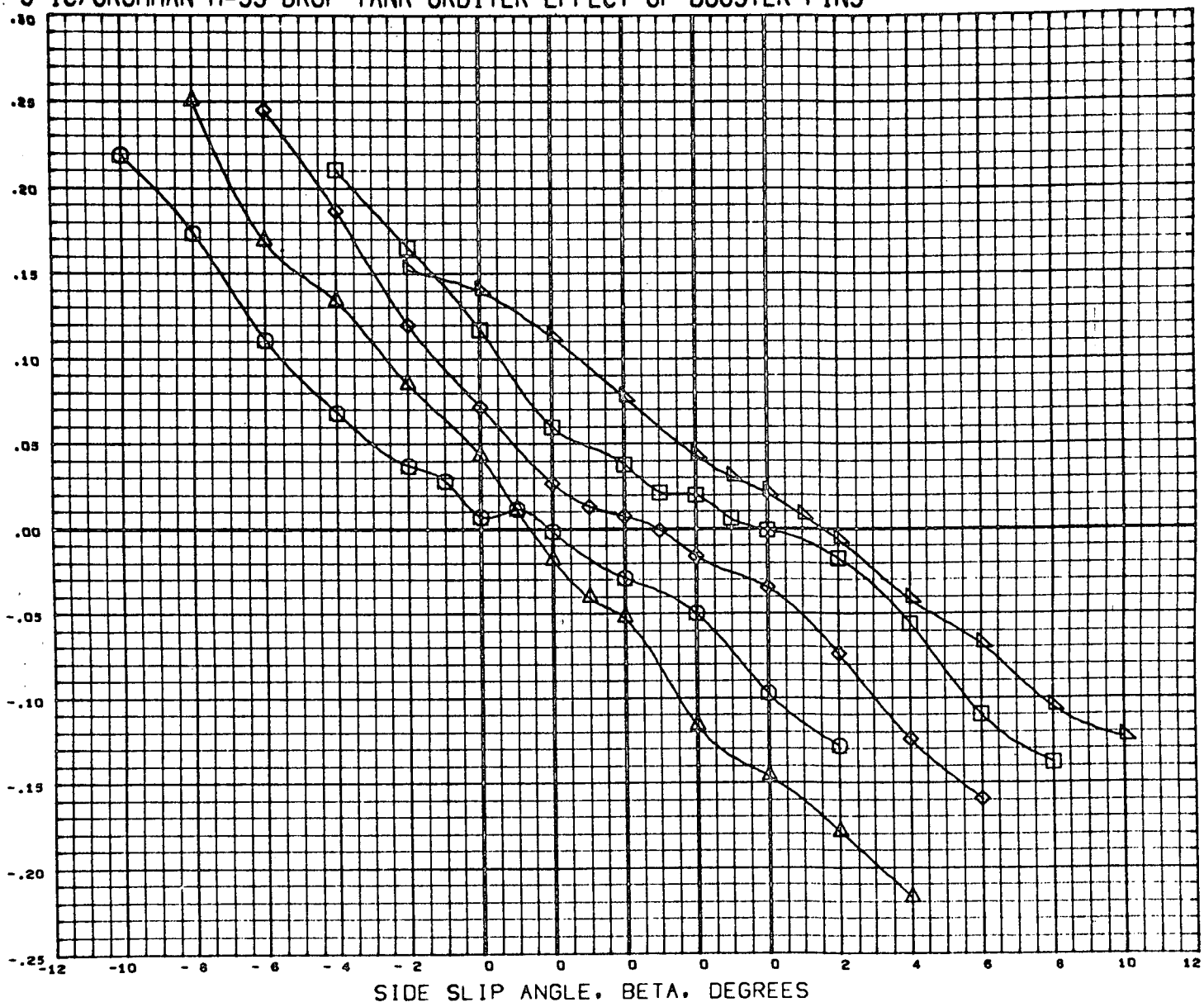
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	BETA	0.000	PHI	0.000
△	1.000				
◇	1.100				
□	1.200				
▽	1.900				

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



SYMBOL	MACH
○	0.900
△	1.000
◇	1.100
□	1.200
▽	1.960

PARAMETRIC VALUES

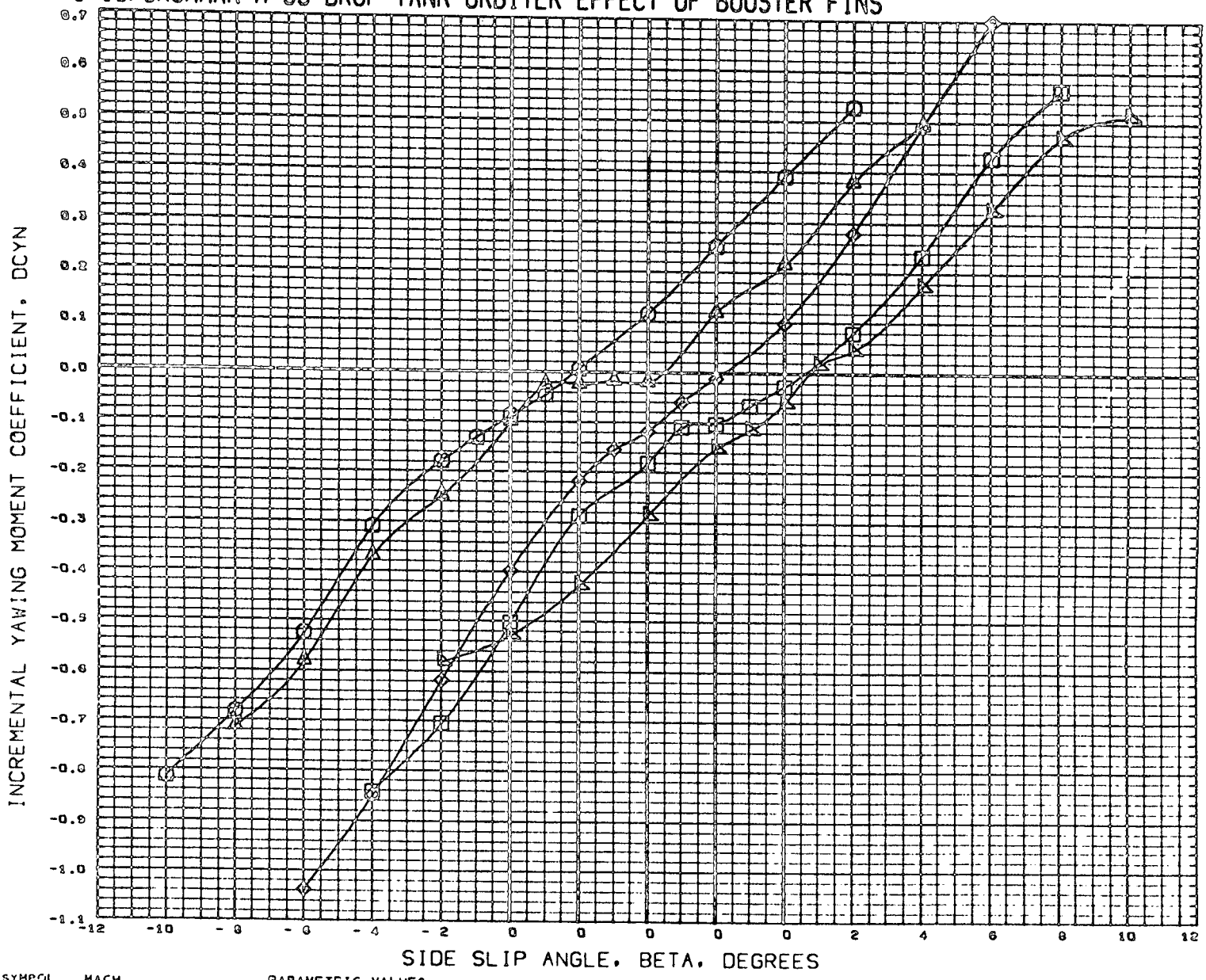
ALPHA 0.000 PHI 90.000

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



SYMBOL	MACH
○	0.900
△	1.000
◇	1.100
□	1.200
▽	1.900

PARAMETRIC VALUES

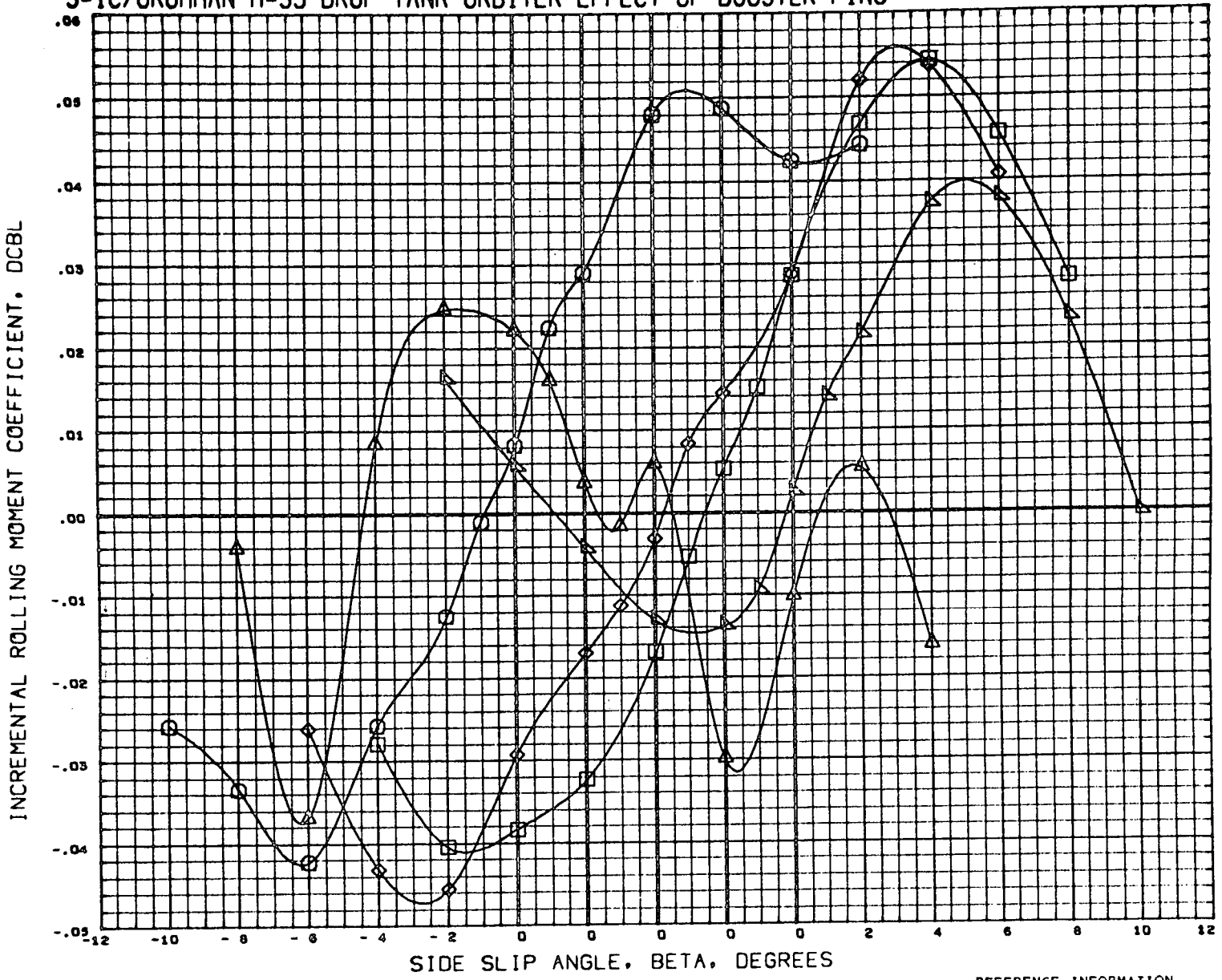
ALPHA 0.000 PHI 90.000

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



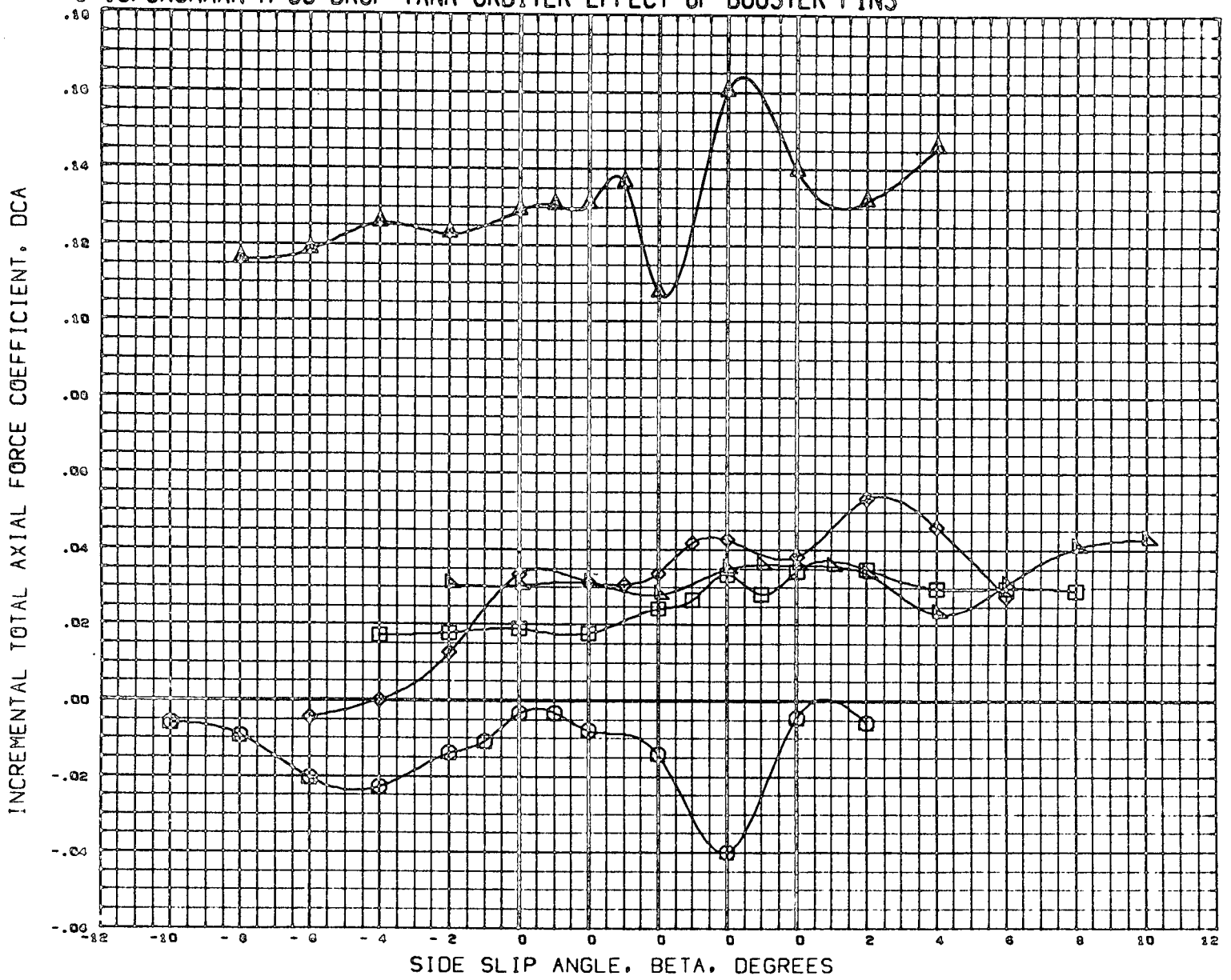
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	ALPHA	0.000	PHI	90.000
△	1.000				
◇	1.100				
□	1.200				
▽	1.960				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



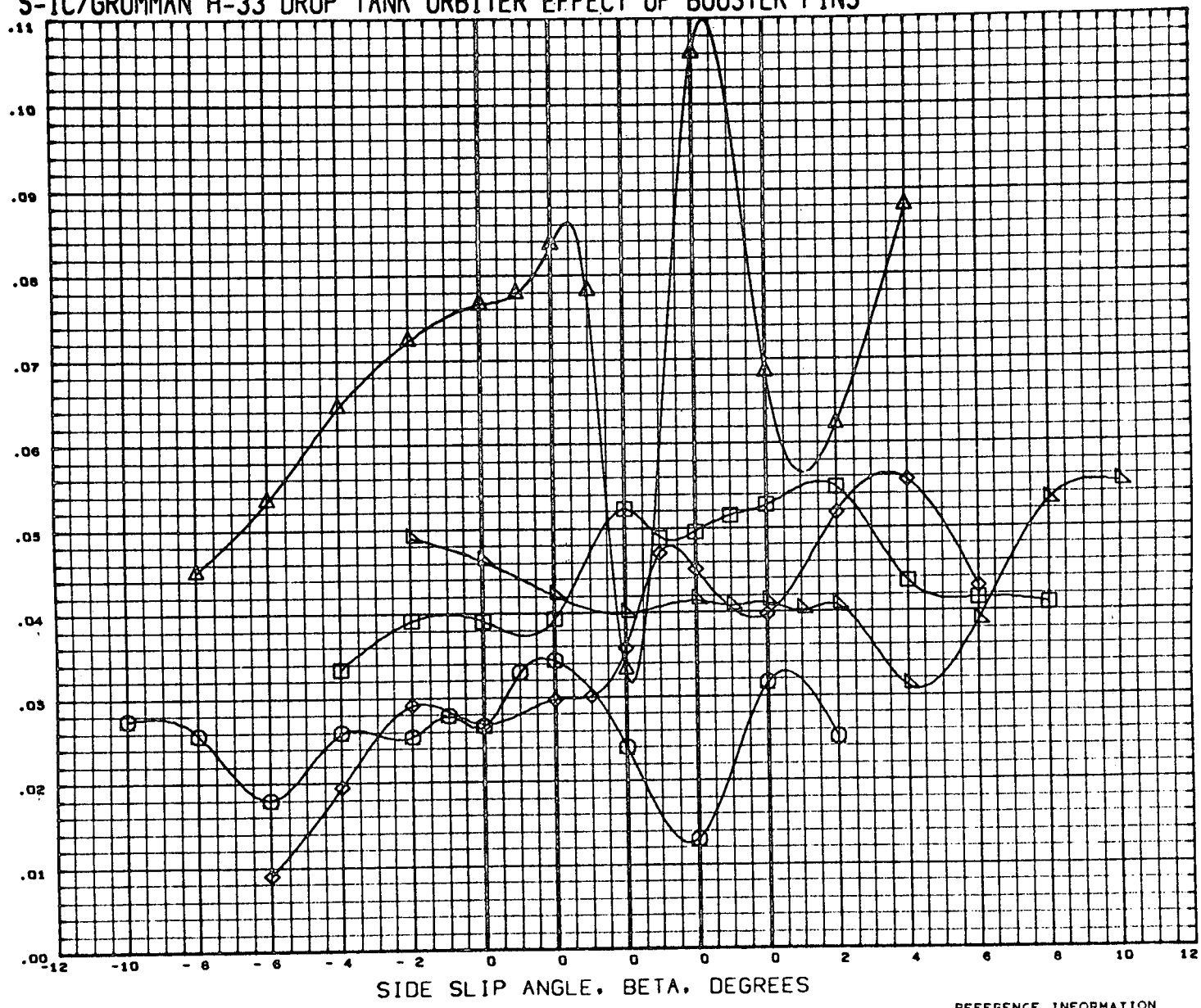
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	ALPHA	0.000	PHI	90.000
△	1.000				
◇	1.100				
□	1.200				
▽	1.900				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



SYMBOL	MACH
○	0.900
△	1.000
◇	1.100
□	1.200
▽	1.960

PARAMETRIC VALUES

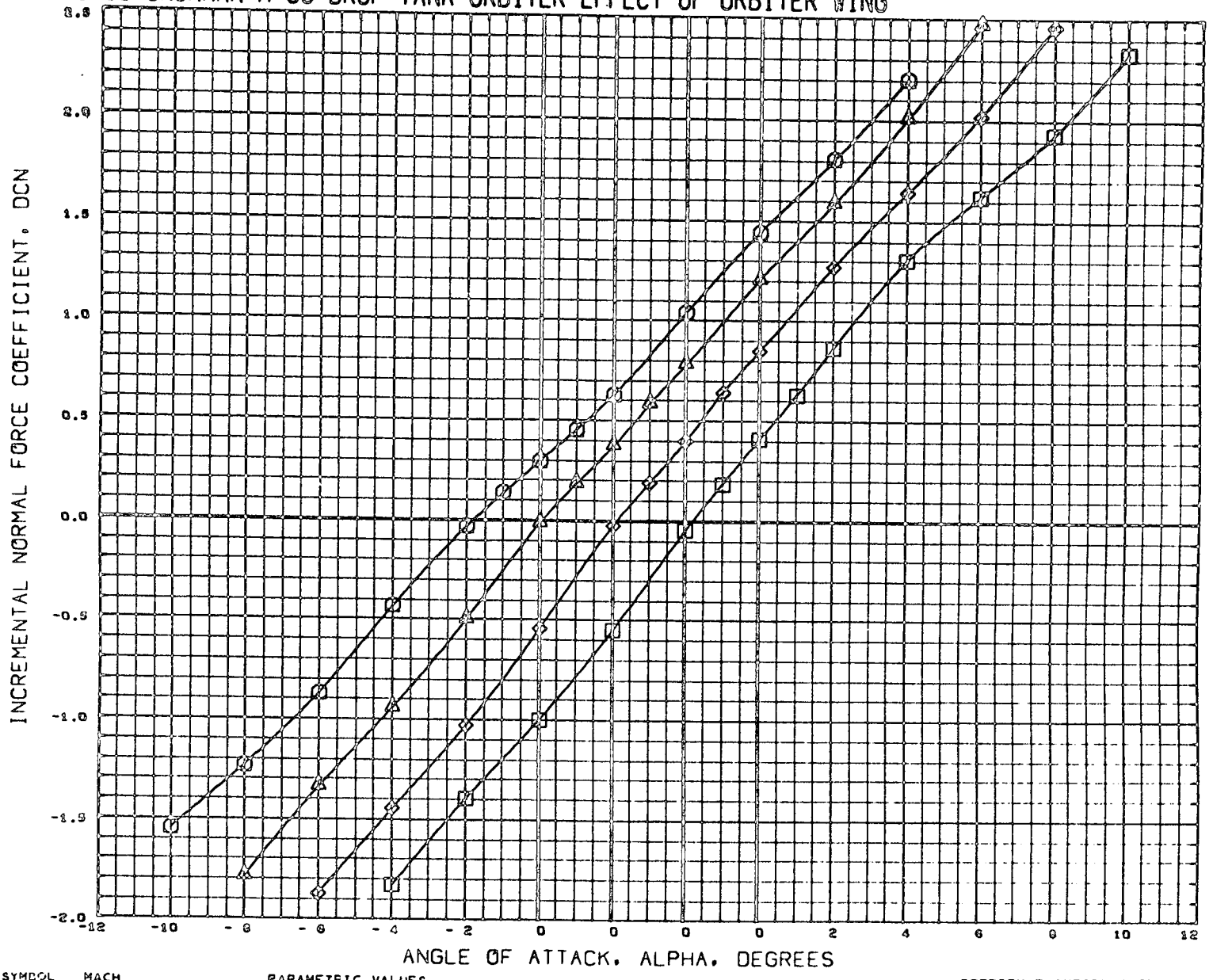
ALPHA 0.000 PHI 90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



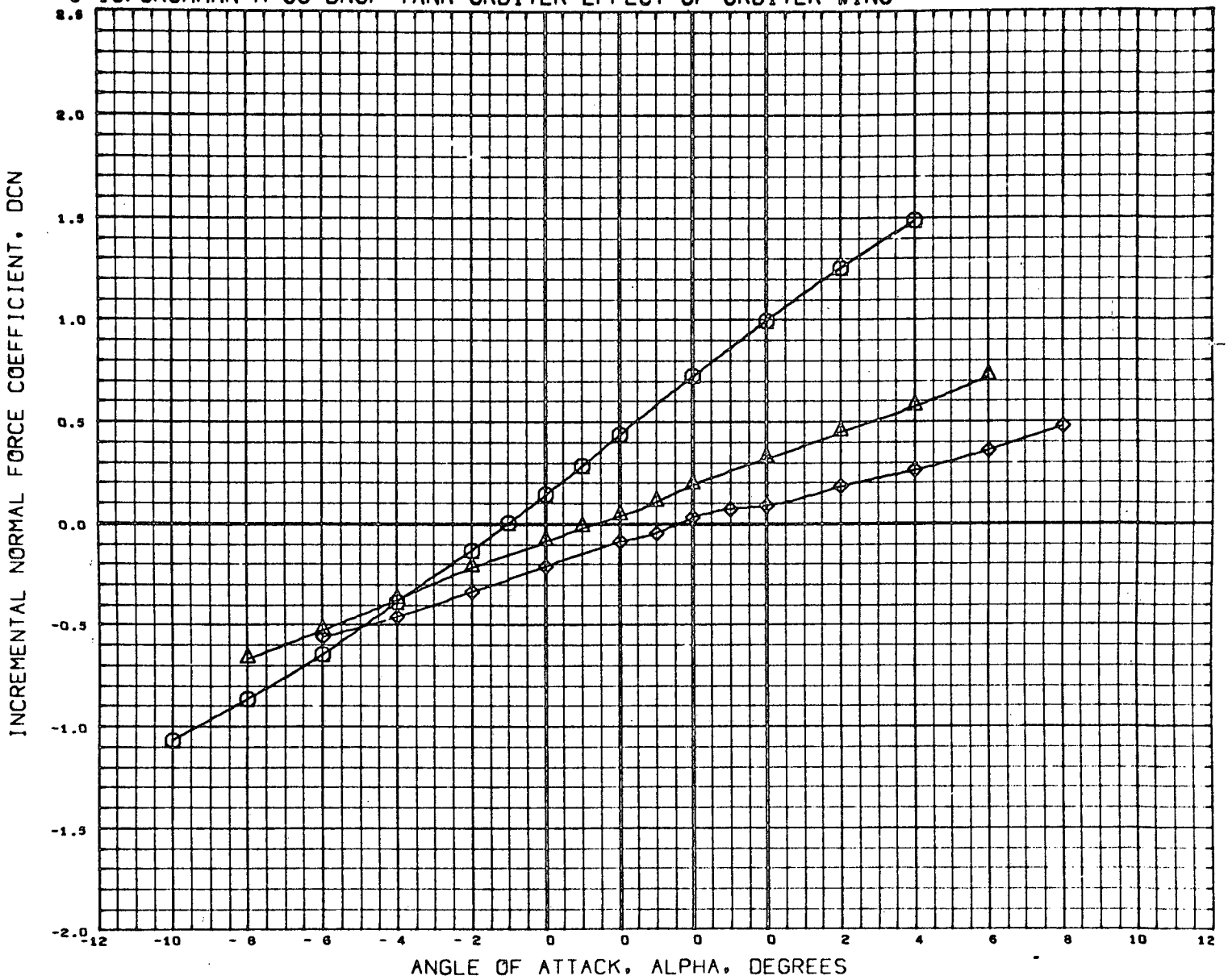
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.900	BETA	0.000	PHI	0.000
△	1.000	WNGIN	0.000		
◇	1.100				
□	1.200				

DATA HIST. CODE CCCI*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



SYMBOL	MACH		PARAMETRIC VALUES		
○	1.960	BETA	0.000	PHI	0.000
△	3.500	WNGIN	0.000		
◇	4.960				

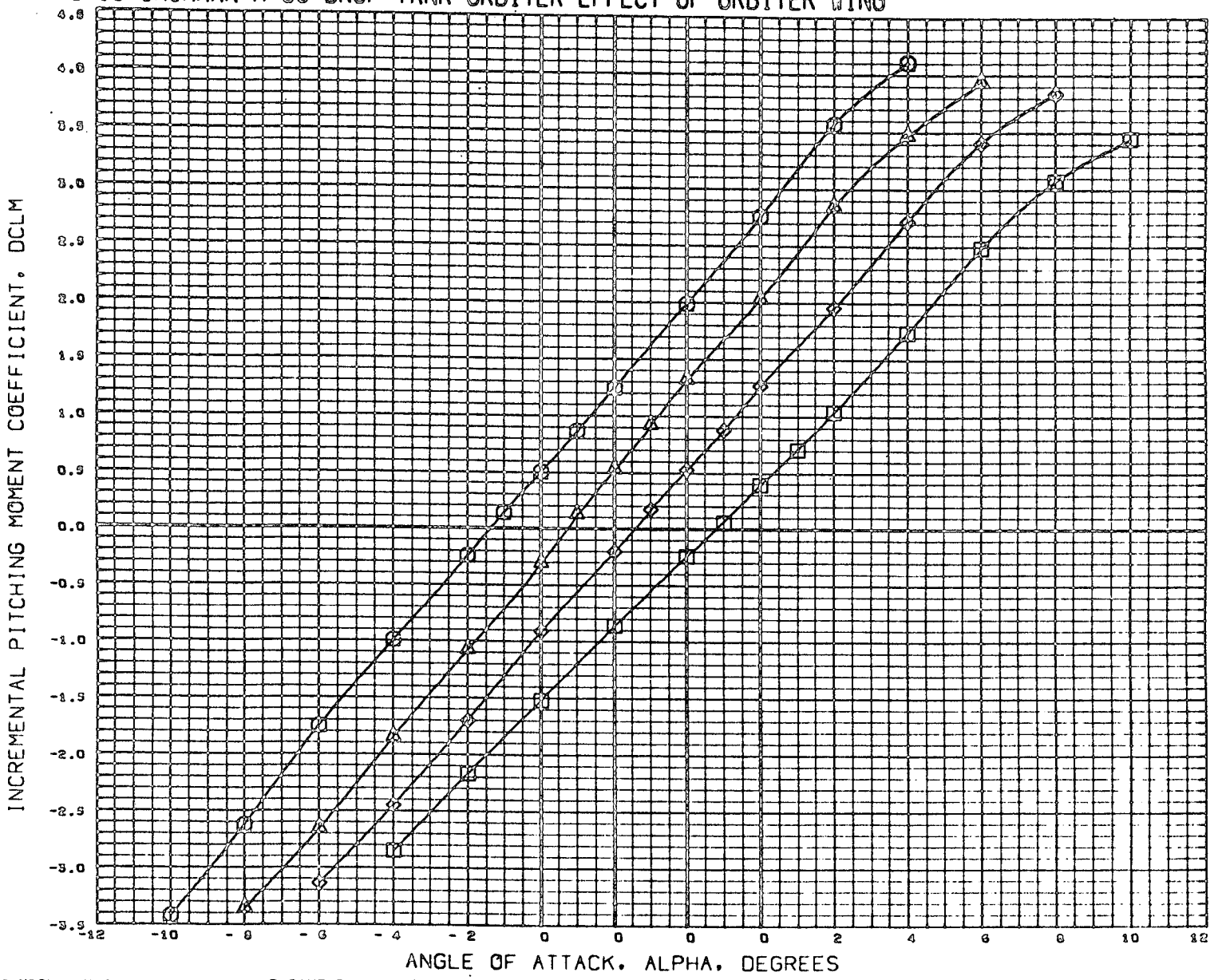
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI*C

C 9

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



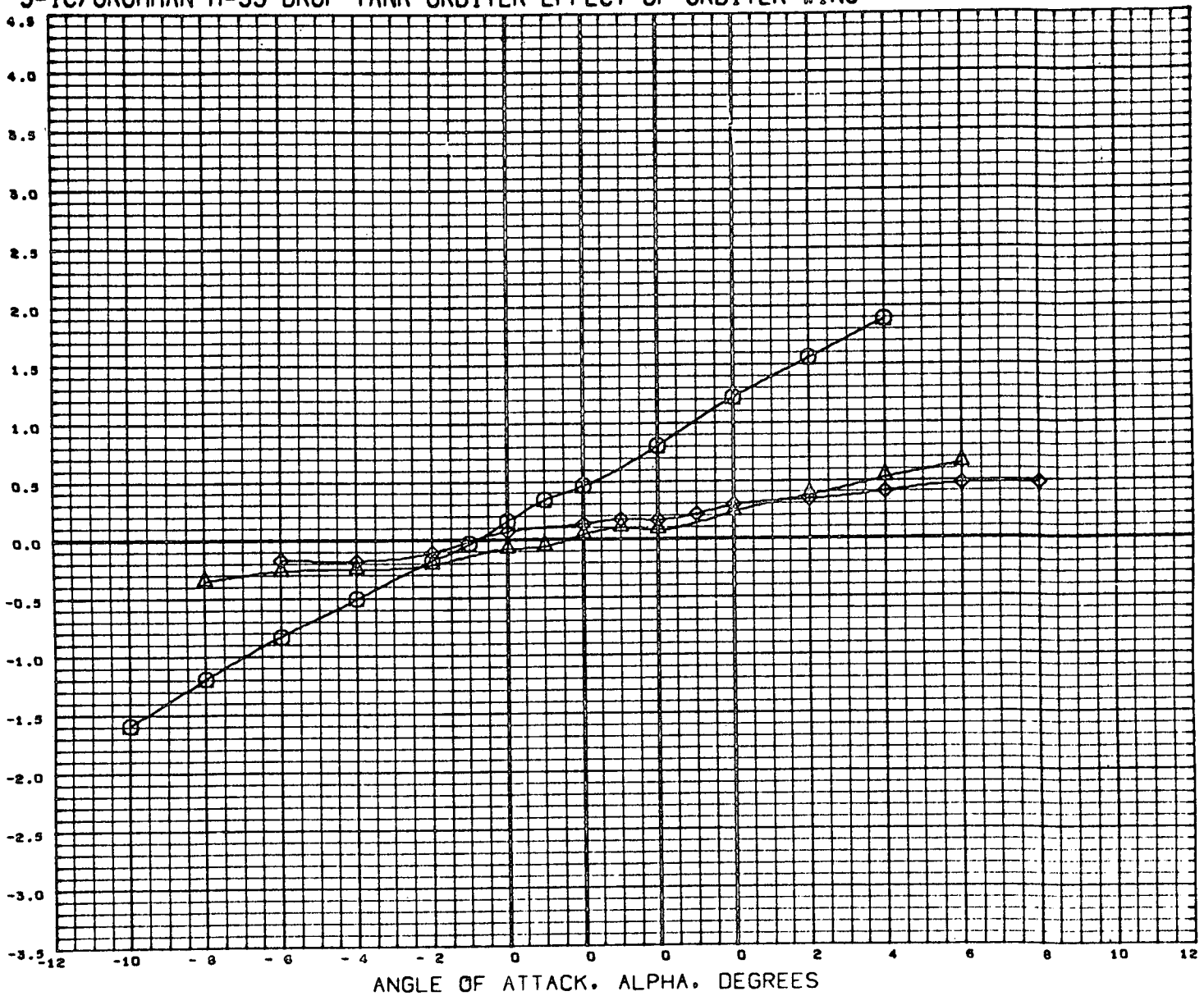
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.900	BETA	0.000	PHI	0.000
△	1.000	WNGIN	0.000		
◇	1.100				
□	1.200				

DATA MIST. CODE CCCI*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



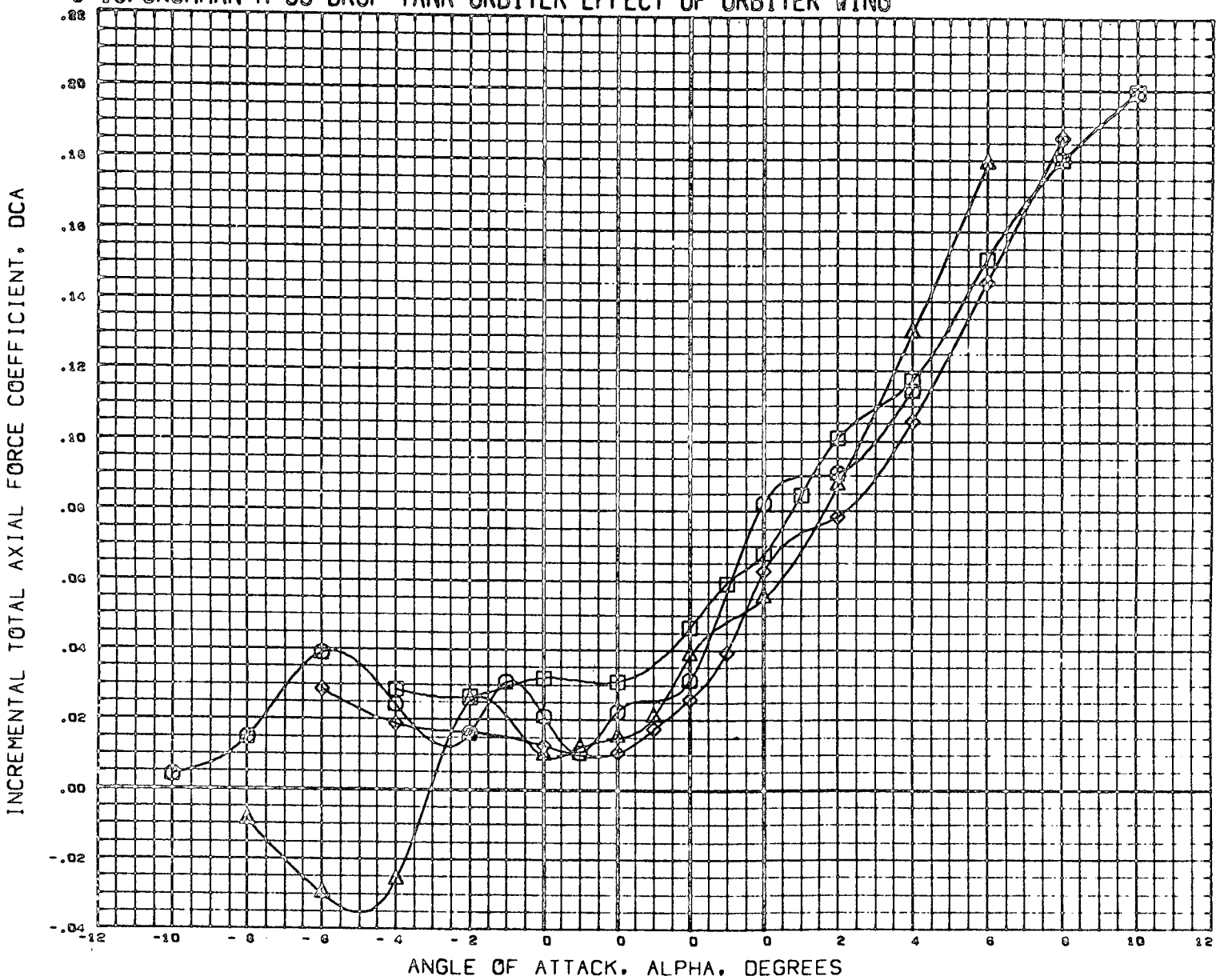
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.960	BETA	0.000	PHI	0.000
△	3.500	WNGIN	0.000		
◇	4.960				

DATA HIST. CODE CCCI#C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



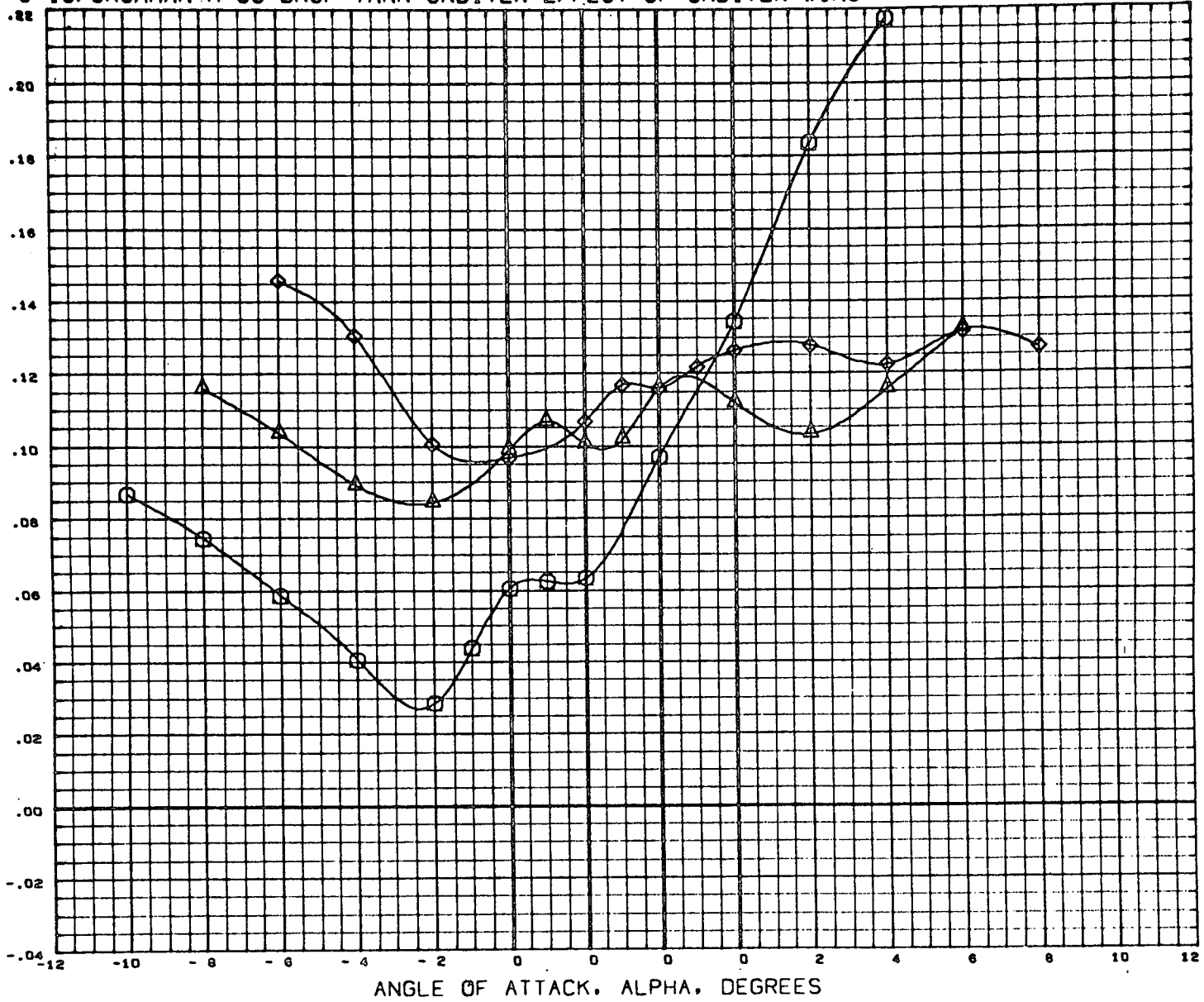
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	BETA	0.000	PHI	0.000
△	1.000	WNGIN	0.000		
◇	1.100				
□	1.200				

DATA HIST. CODE CCCI*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	9.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



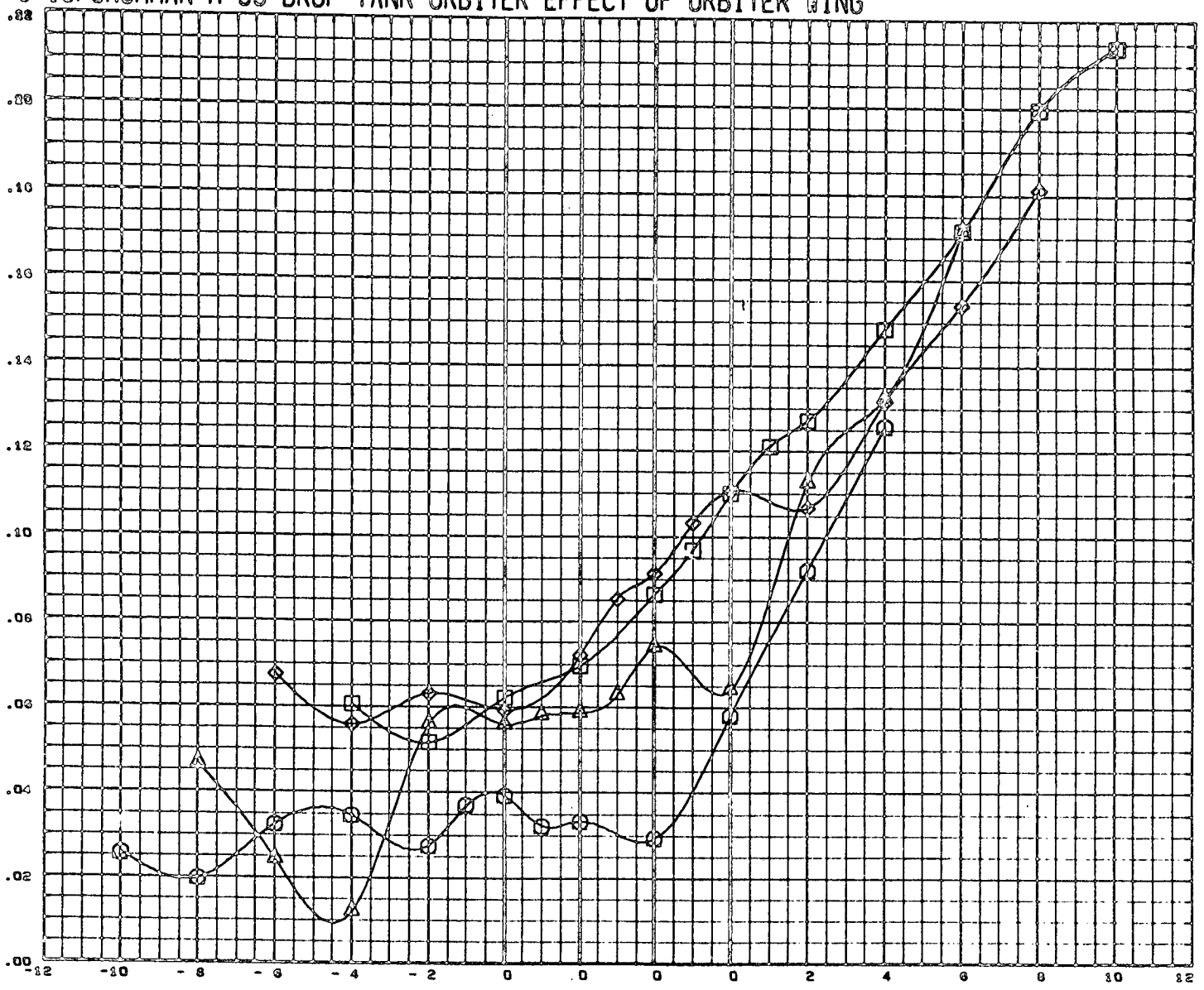
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.960	BETA	0.000	PHI	0.000
△	3.500	WNGIN	0.000		
◇	4.960				

DATA HIST. CODE CCC1*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



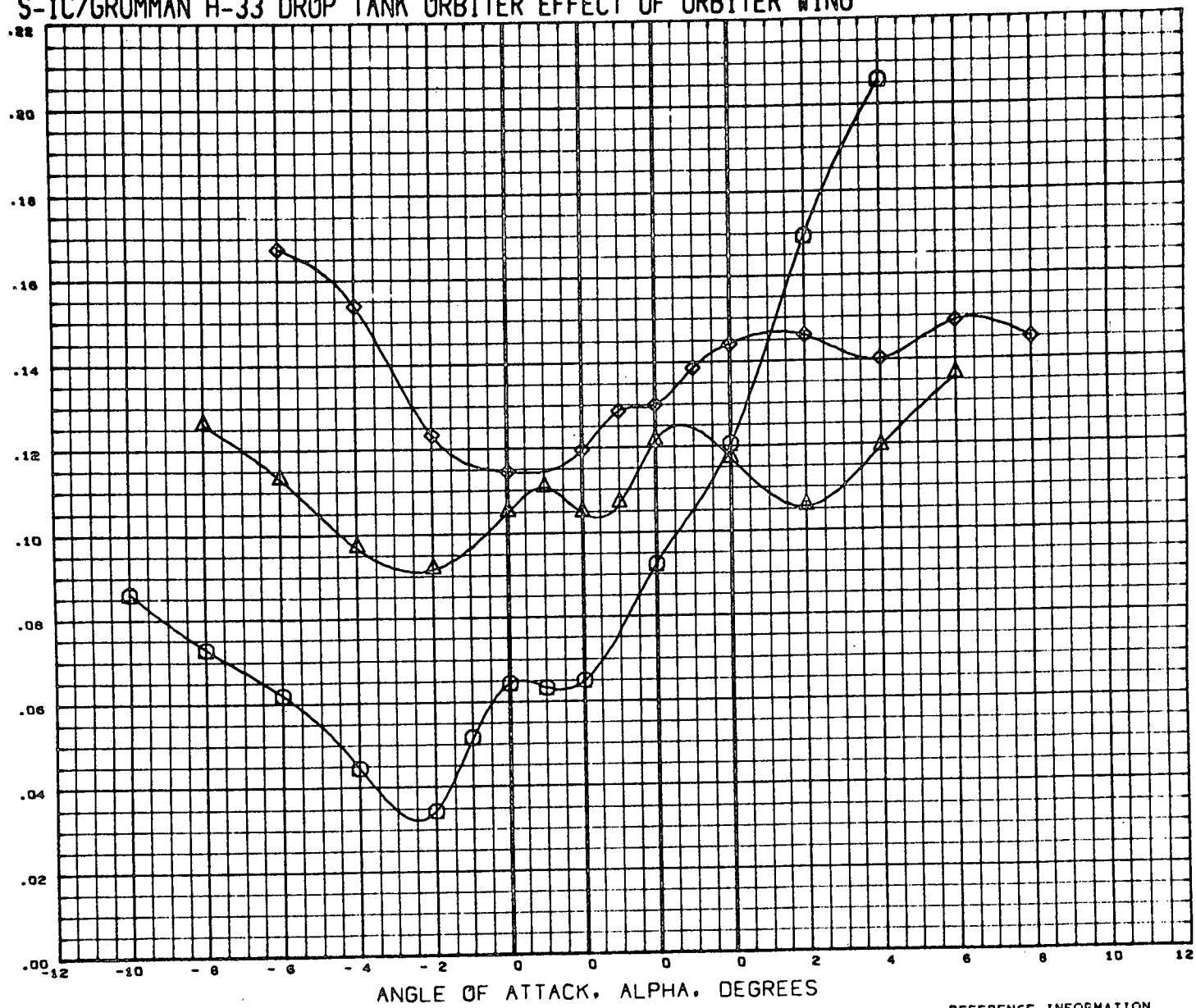
SYMBOL	MACH		PARAMETRIC VALUES		
○	0.900	BETA	0.000	PHI	0.000
△	1.000	WNGIN	0.000		
◇	1.100				
□	1.200				

DATA HIST. CODE CCCI*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



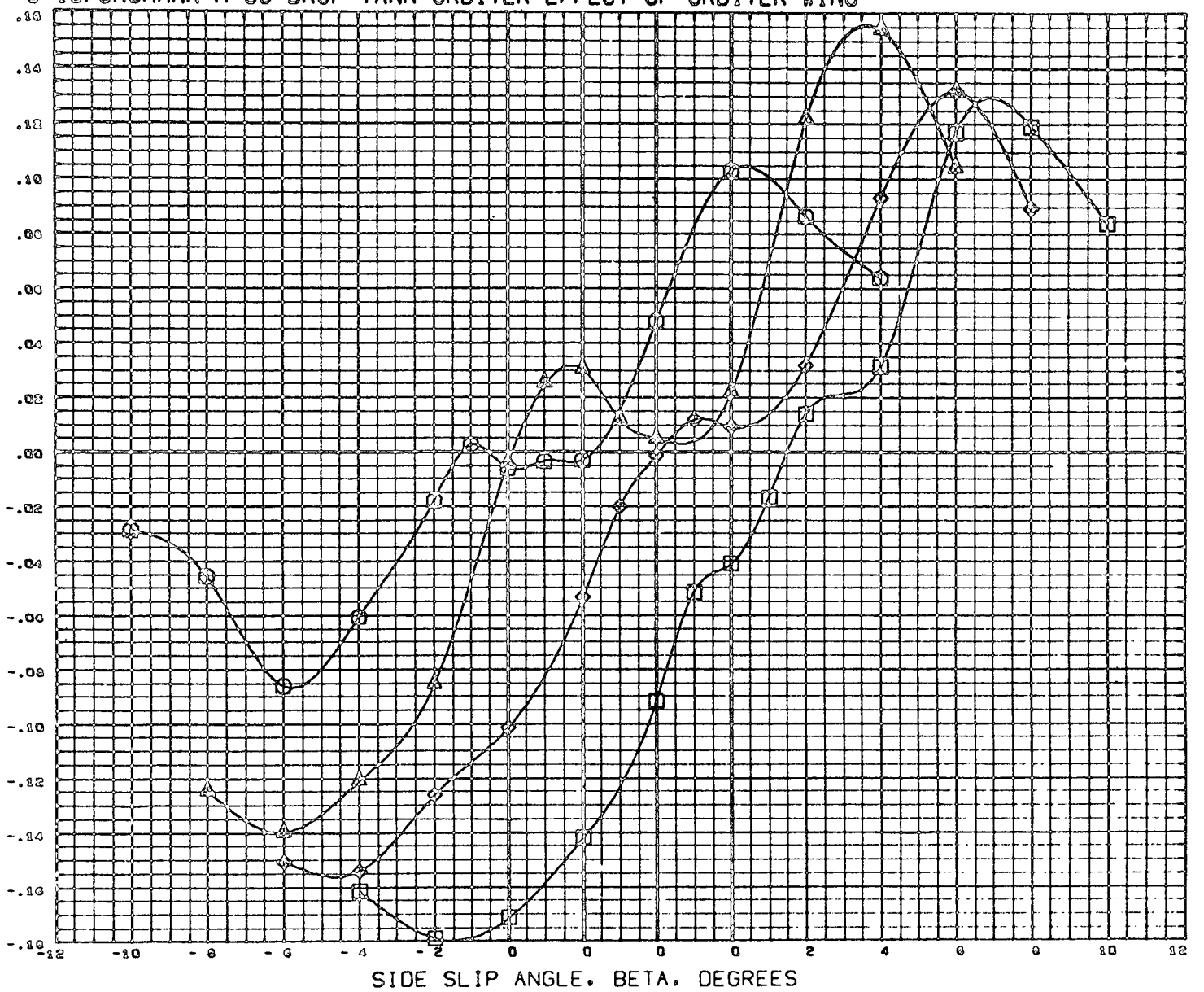
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	BETA	0.000	PHI	0.000
△	3.500	WRGIN	0.000		
◇	4.960				

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

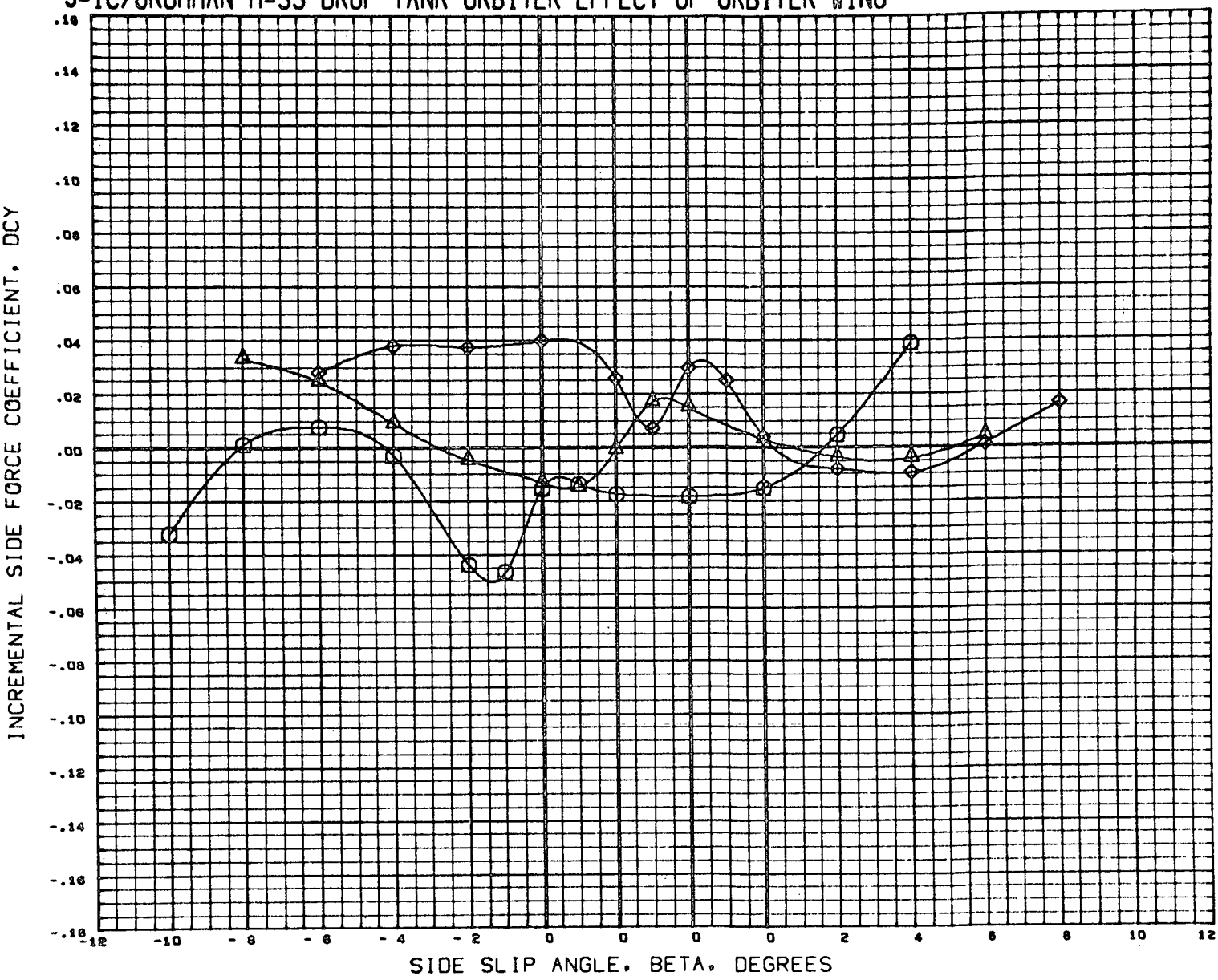


SYMBOL	MACH		PARAMETRIC VALUES		
○	0.900	ALPHA	0.000	PHI	90.000
△	1.000	WNGIN	0.000		
◇	1.100				
□	1.200				

DATA HIST. CODE CCCI*C

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



SYMBOL	MACH
○	1.960
△	3.500
◇	4.960

PARAMETRIC VALUES

ALPHA	0.000	PHI	90.000
WNGIN	0.000		

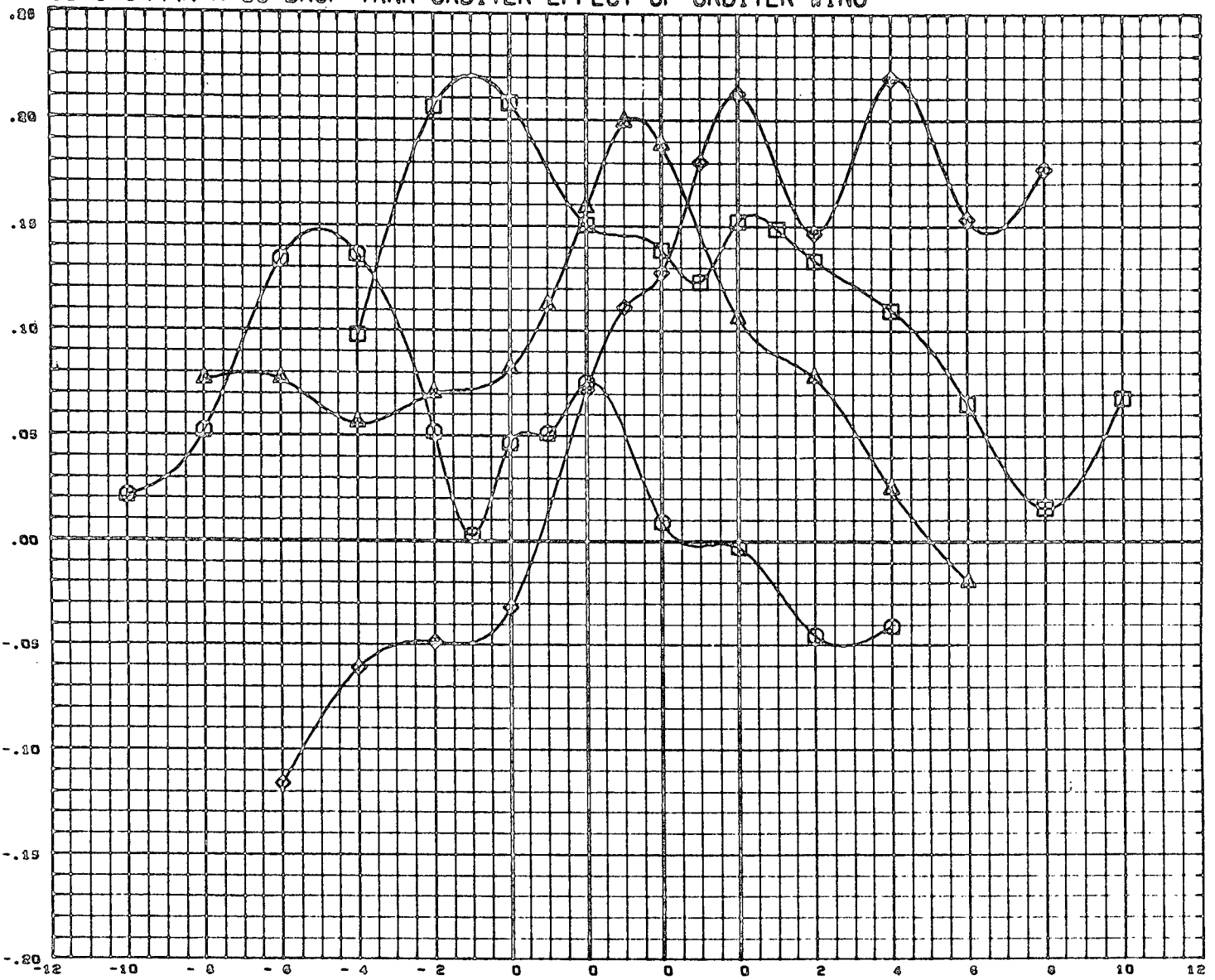
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI*C

M502-MSFC-SIC INCREMENTAL DATA(OWVCBF- OVCBF) (J44055) 12 MAY 72 PAGE 437

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

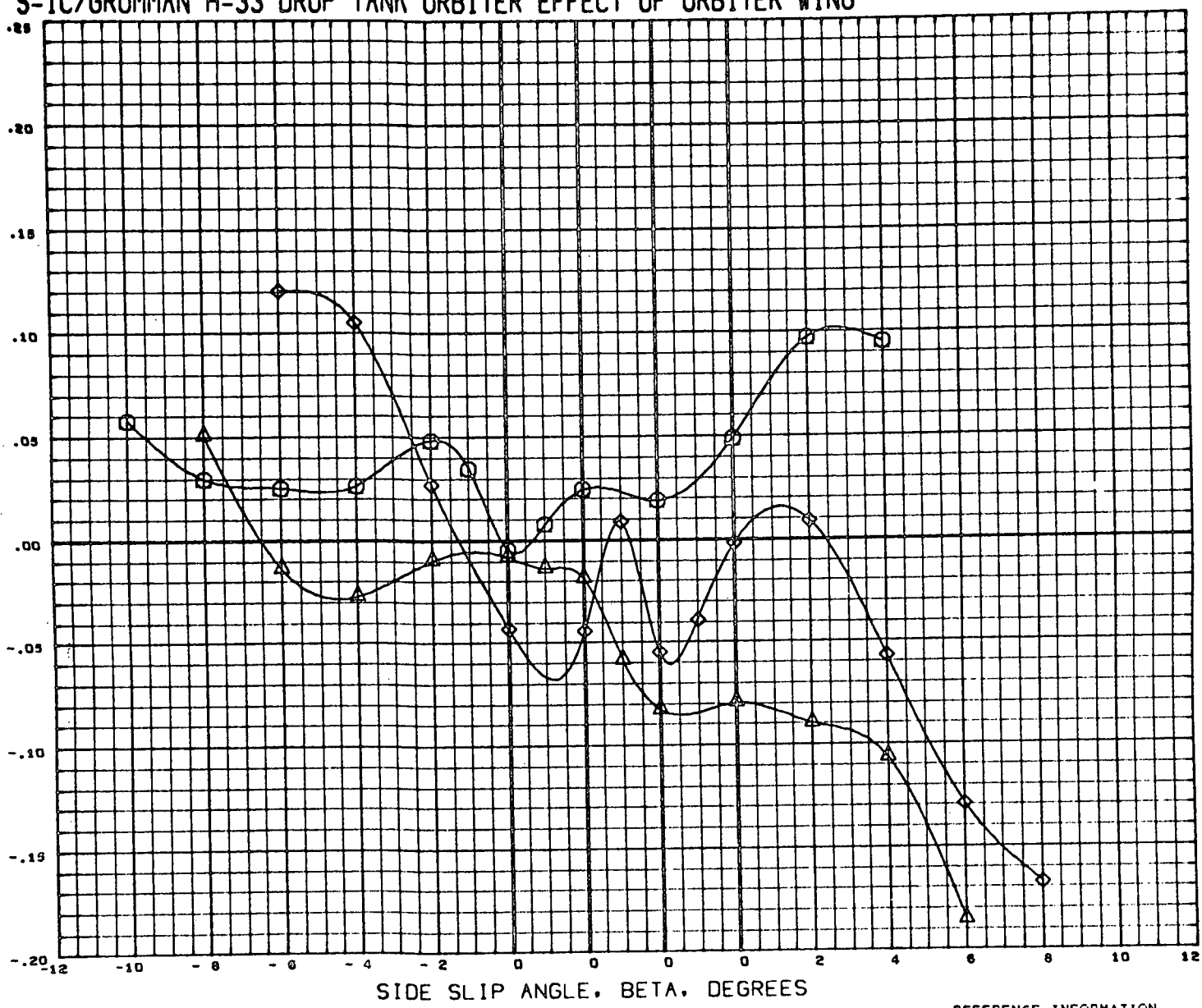


SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	ALPHA	0.000	PHI	90.000
△	1.000	WNGIN	0.000		
◇	1.100				
□	1.200				

DATA HIST. CODE CCCI*C

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



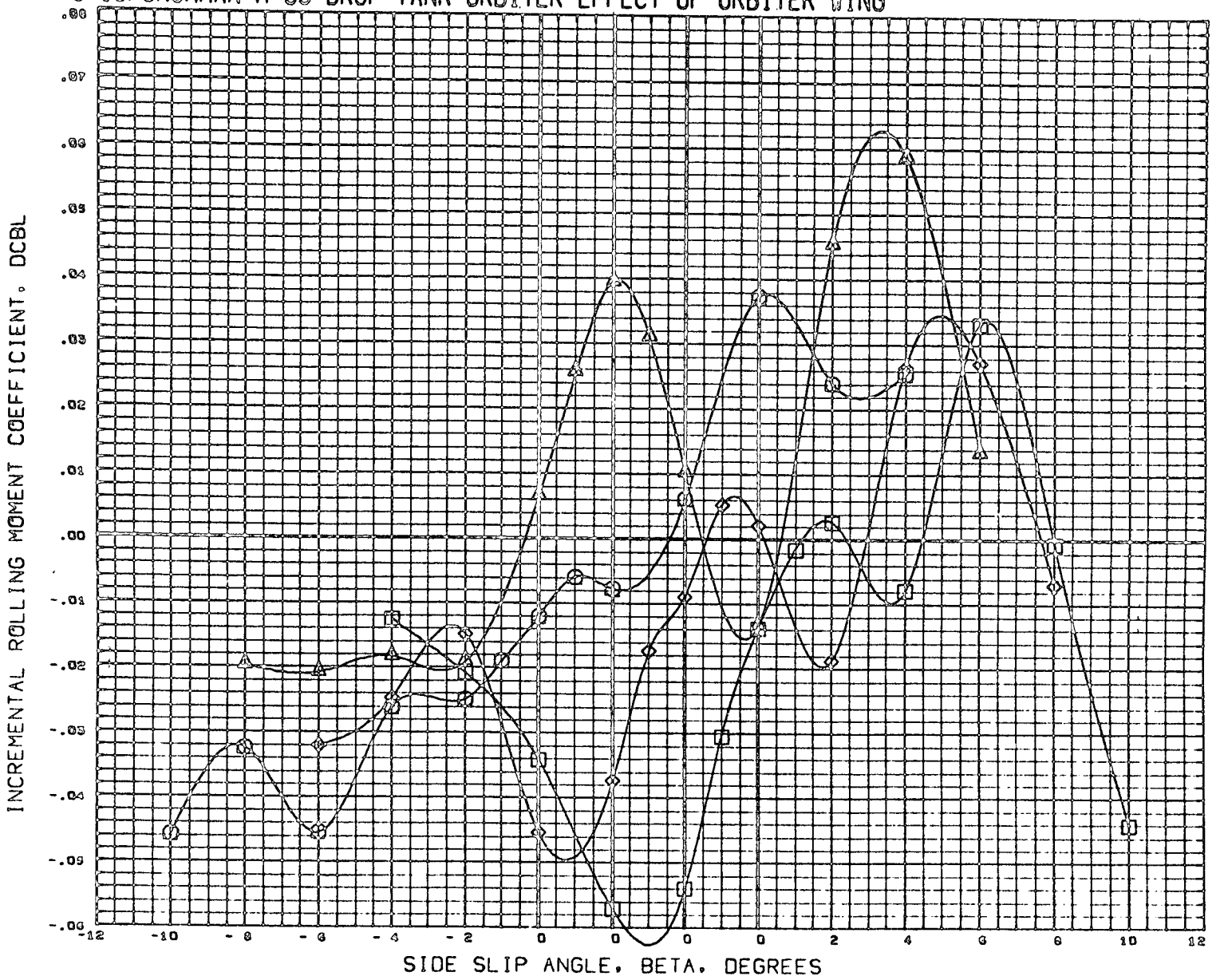
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.960	ALPHA	0.000	PHI	90.000
△	3.500	WNGIN	0.000		
◇	4.960				

DATA HIST. CODE CCCI*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-IC/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



SYMBOL	MACH
○	0.900
△	1.000
◇	1.100
□	1.200

PARAMETRIC VALUES

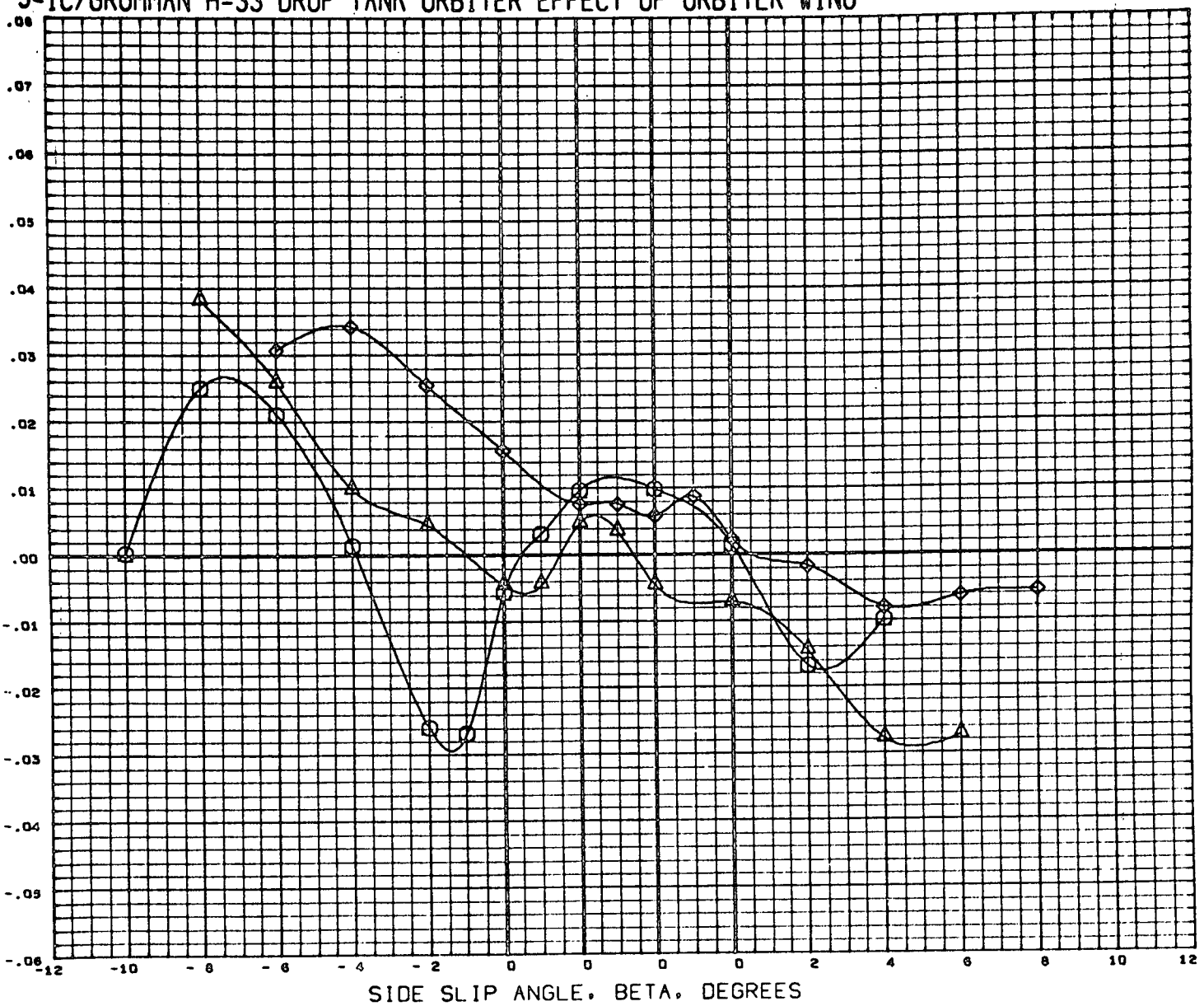
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	9.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCC14C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



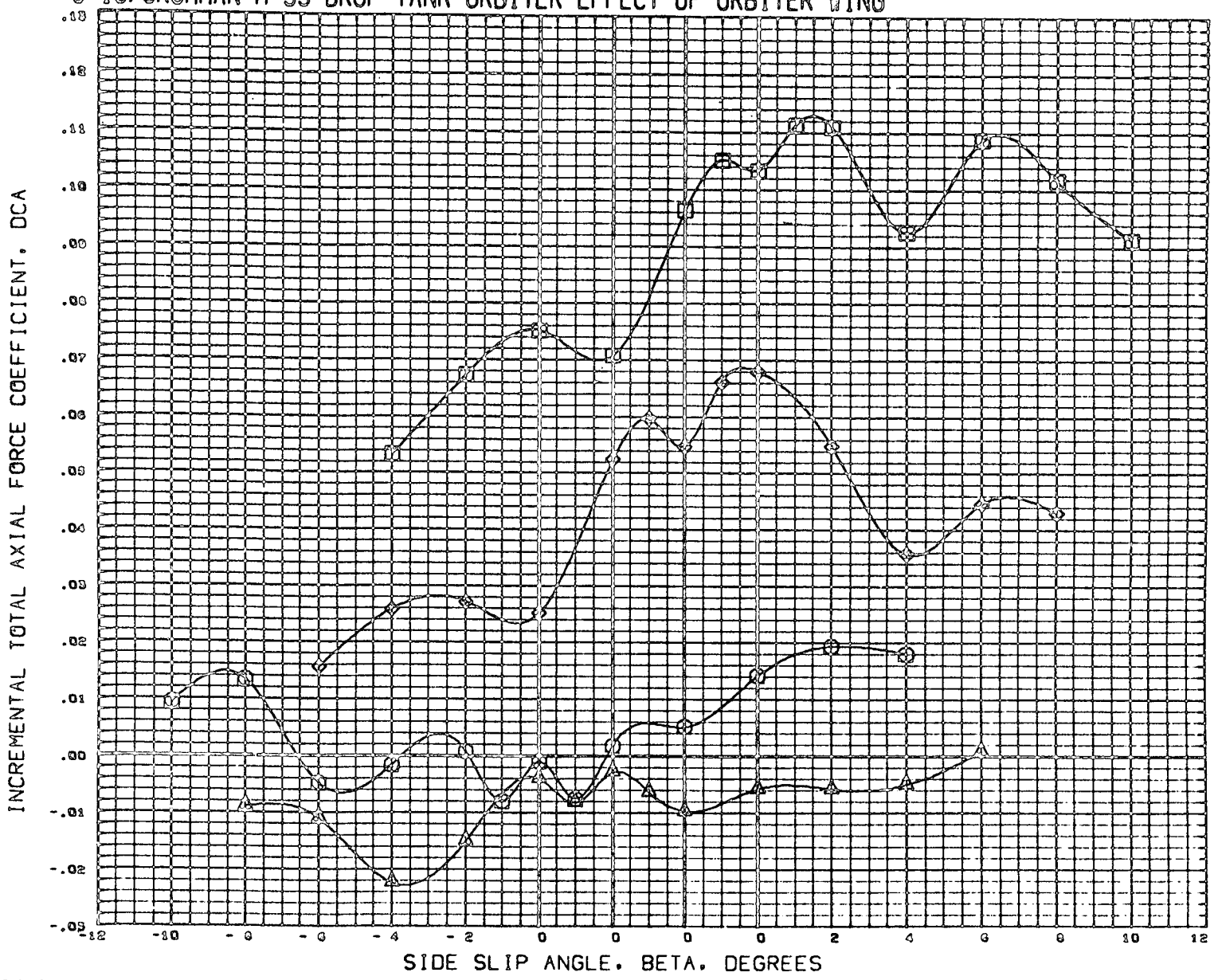
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	ALPHA	0.000	PHI	90.000
△	3.900	WNGIN	0.000		
◇	4.960				

DATA HIST. CODE CCCI*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



SYMBOL	MACH
○	0.900
△	1.000
◇	1.100
□	1.200

PARAMETRIC VALUES

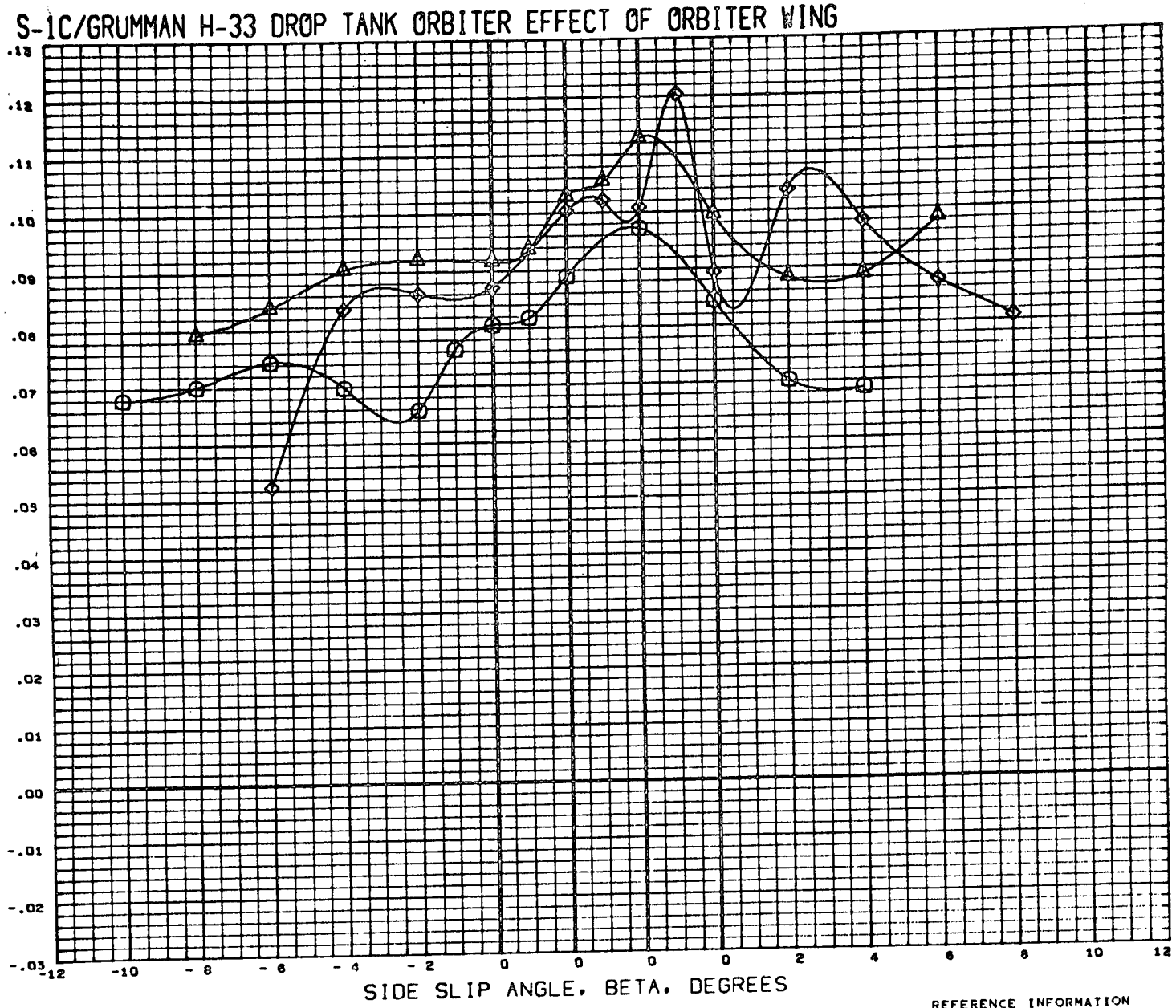
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

DATA HIST. CODE CCCI*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



SYMBOL	MACH		PARAMETRIC VALUES		
○	1.960	ALPHA	0.000	PHI	90.000
△	3.500	WNGIN	0.000		
◇	4.960				

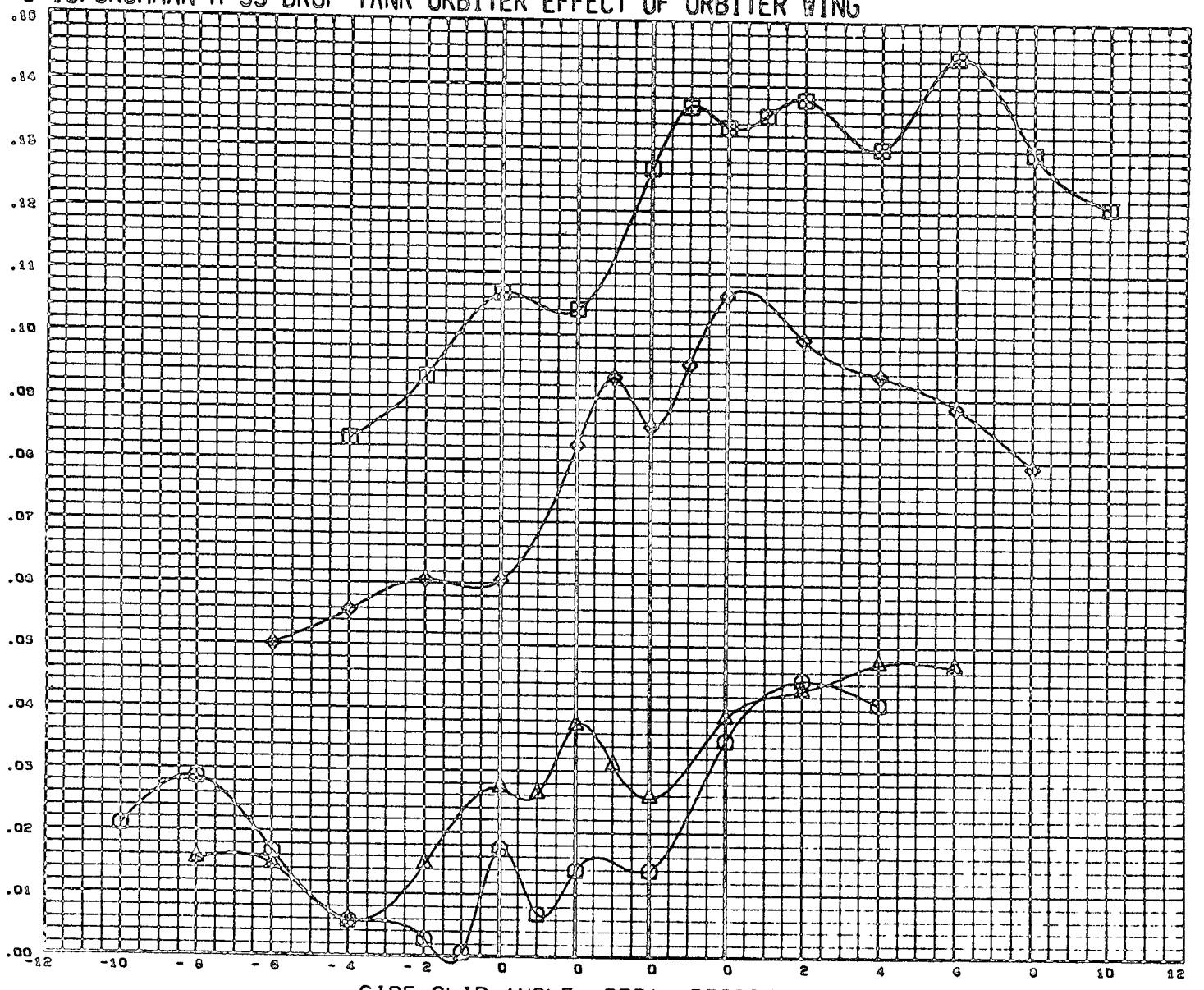
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI*C

M502-MSFC-S1C INCREMENTAL DATA(OWVCBF- OVCBF) (J44055) 12 MAY 72 PAGE 443

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



SYMBOL	MACH
○	0.900
△	1.000
◇	1.200
□	1.200

PARAMETRIC VALUES

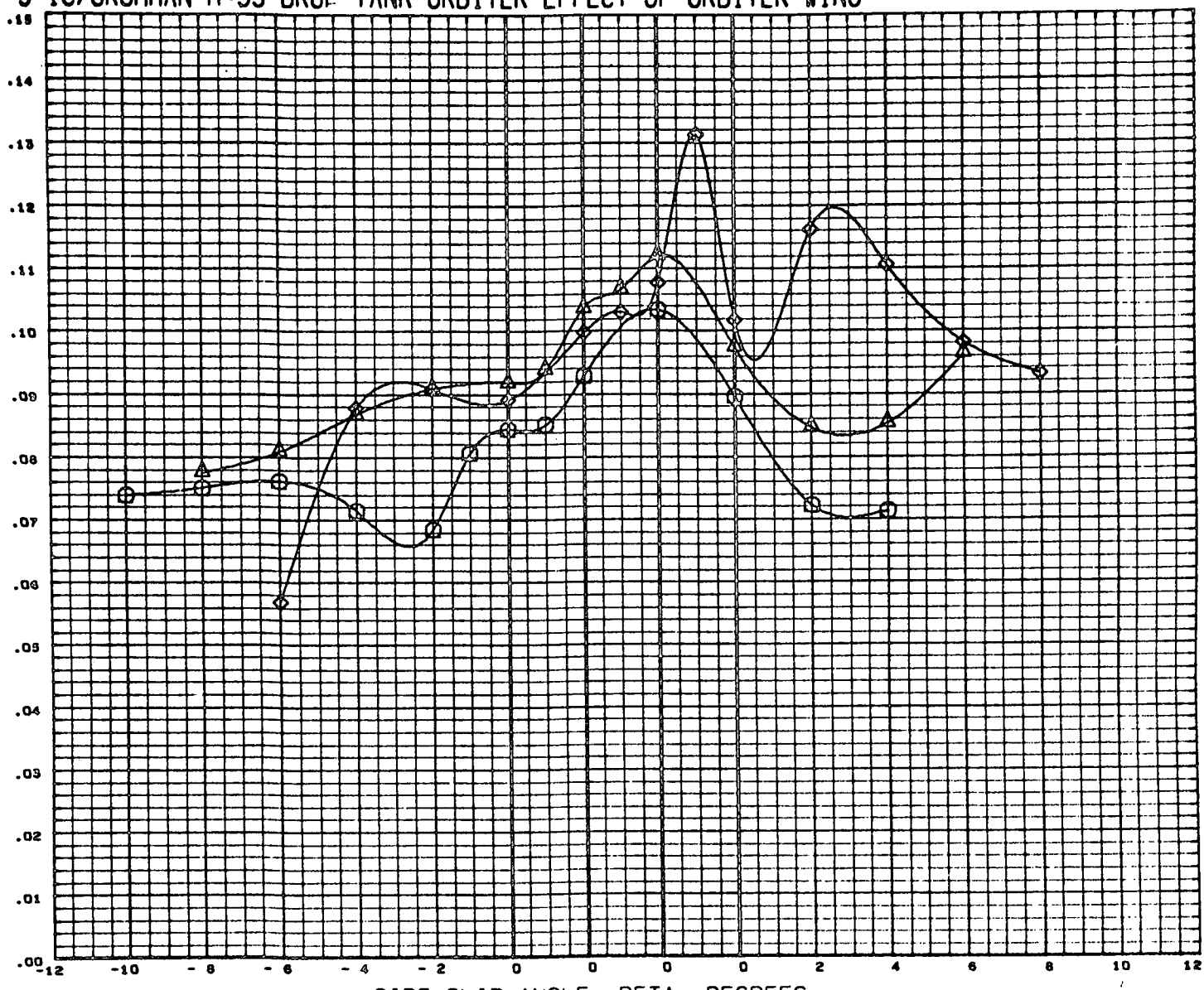
ALPHA	0.000	PHI	90.000
WNGIN	0.000		

DATA HIST. CODE CCCI*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	9.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



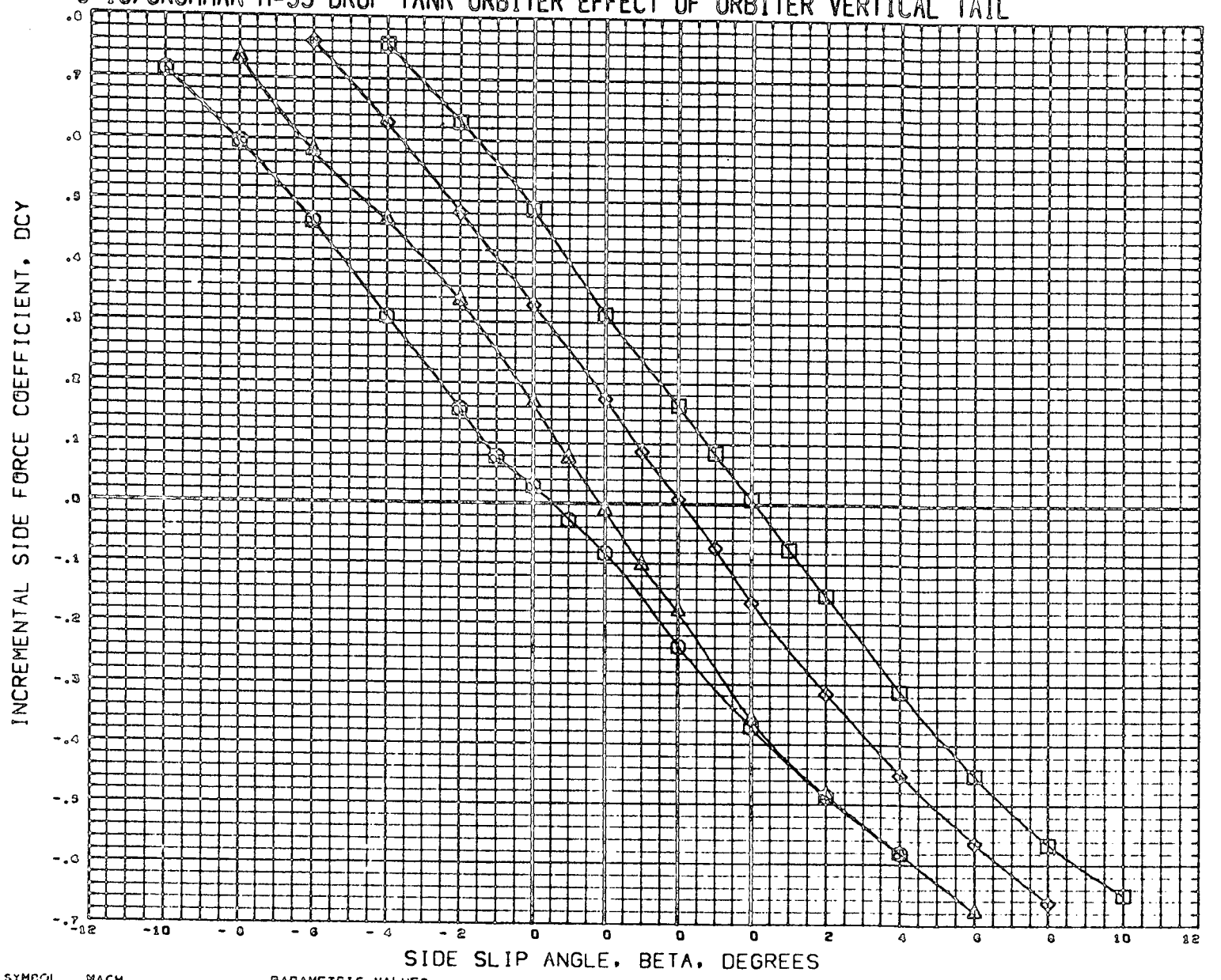
SYMBOL	MACH		PARAMETRIC VALUES		
○	1.960	ALPHA	0.000	PHI	90.000
△	3.500	WNGIN	0.000		
◇	4.960				

DATA HIST. CODE CCCI*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



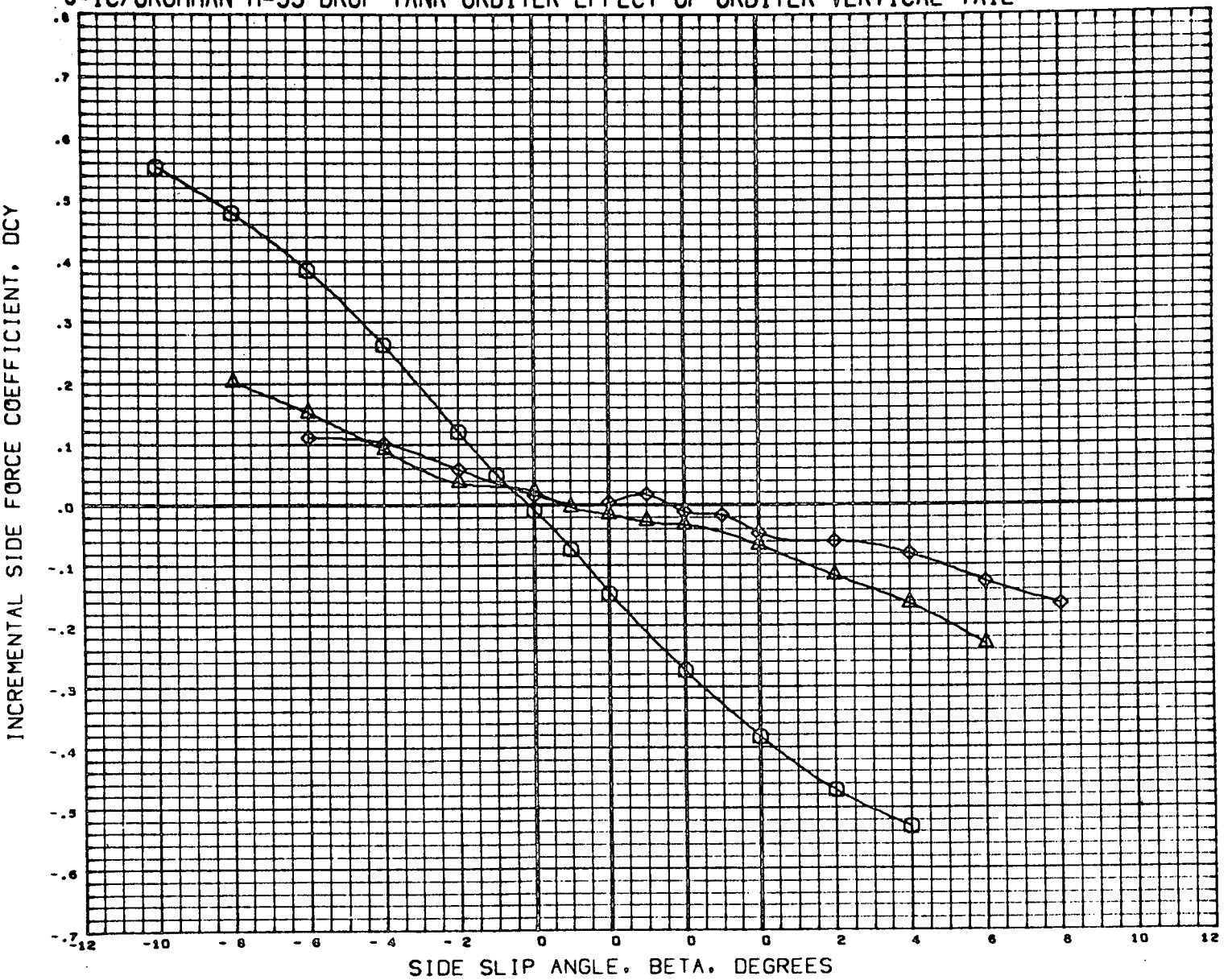
SYMBOL	MACH	PARAMETRIC VALUES		
○	0.900	ALPHA	0.000	PHI 90.000
△	1.000			
◇	1.100			
□	1.200			

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



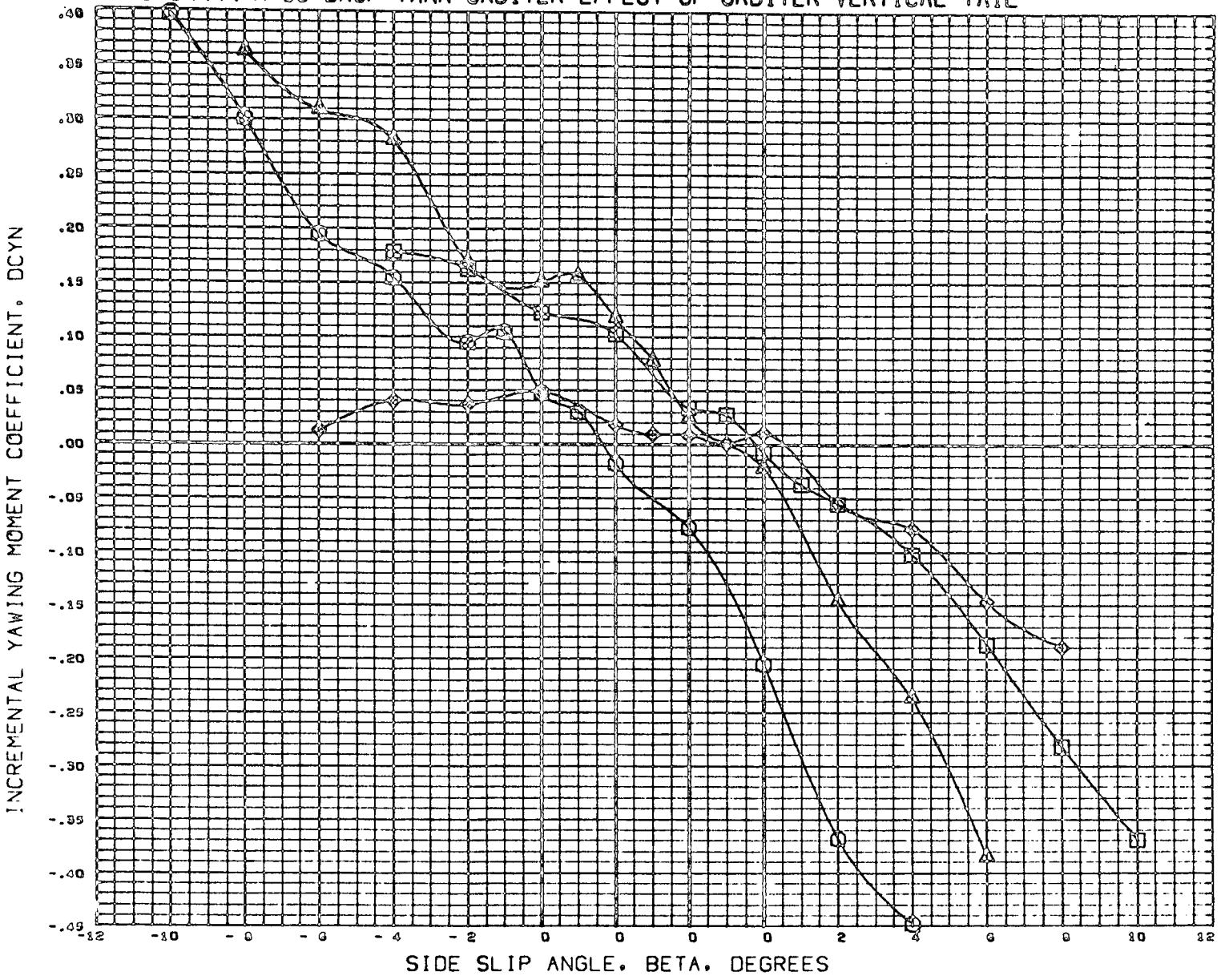
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	ALPHA	0.000	PHI	90.000
△	3.500				
◇	4.960				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



SYMBOL	MACH
○	0.900
△	1.000
◇	1.100
□	1.200

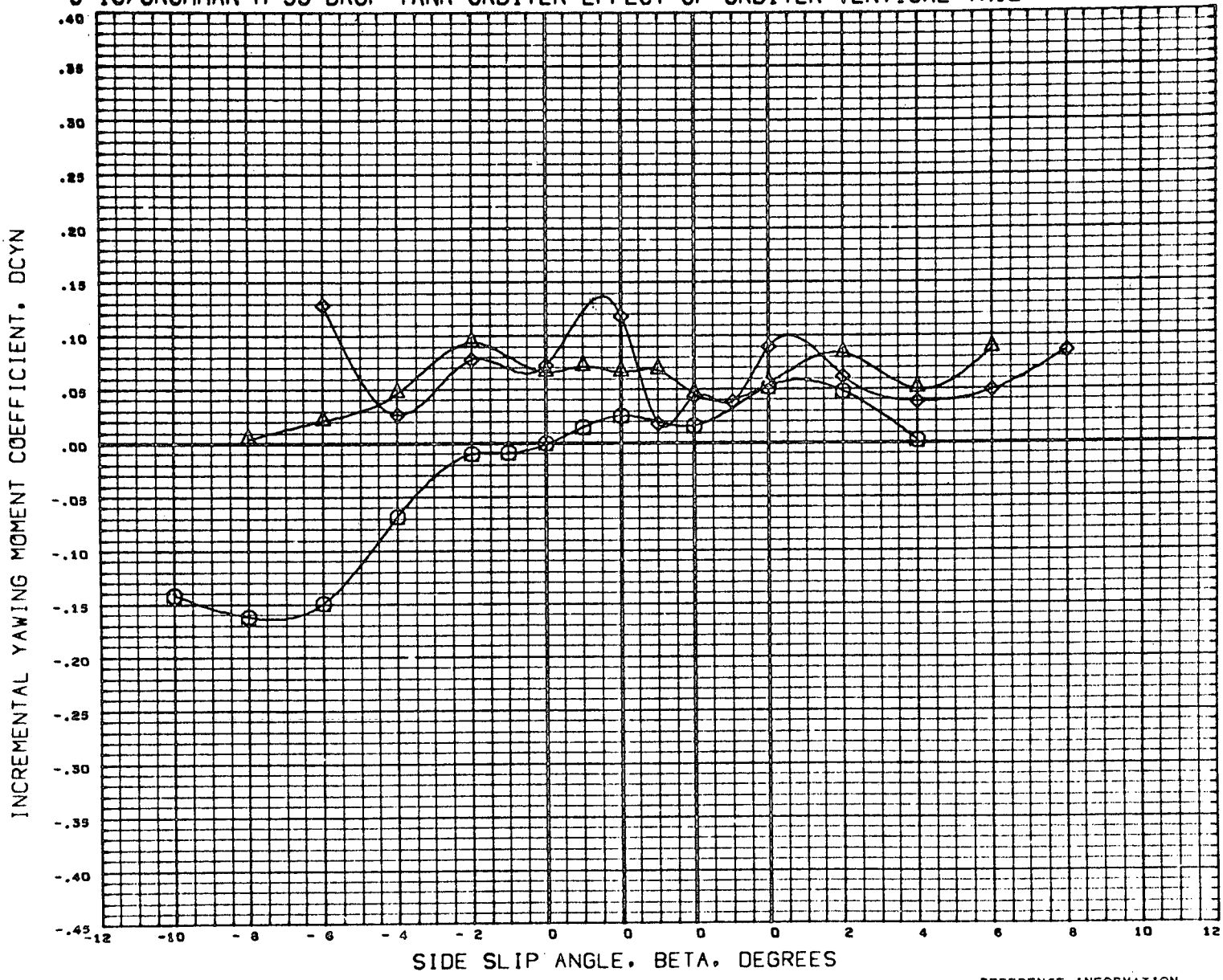
PARAMETRIC VALUES: ALPHA 0.000 PHI 90.000

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



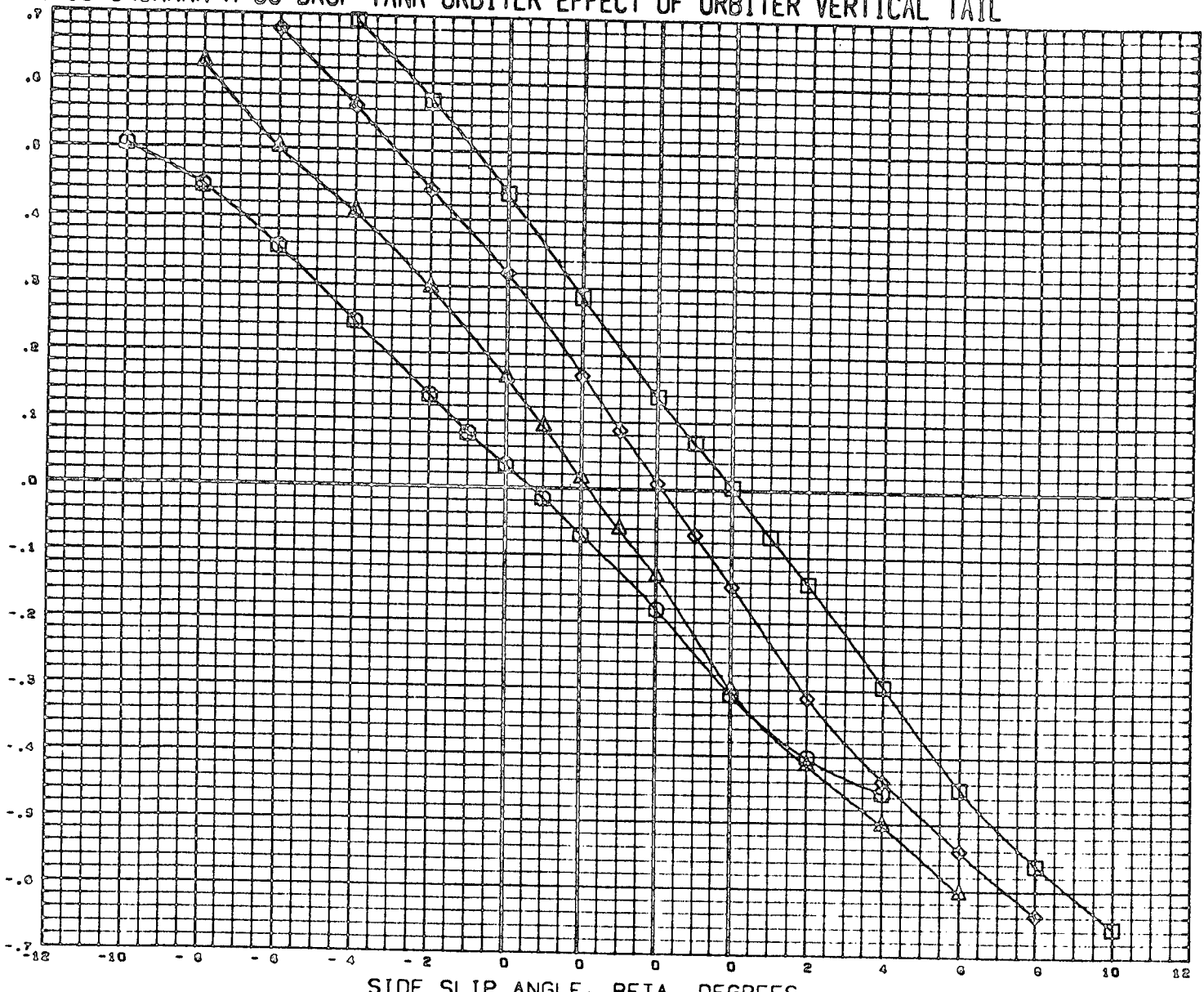
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	ALPHA	0.000	PHI	90.000
△	3.500				
◇	4.960				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



SYMBOL	MACH
○	0.900
△	1.000
◇	1.100
□	1.200

PARAMETRIC VALUES

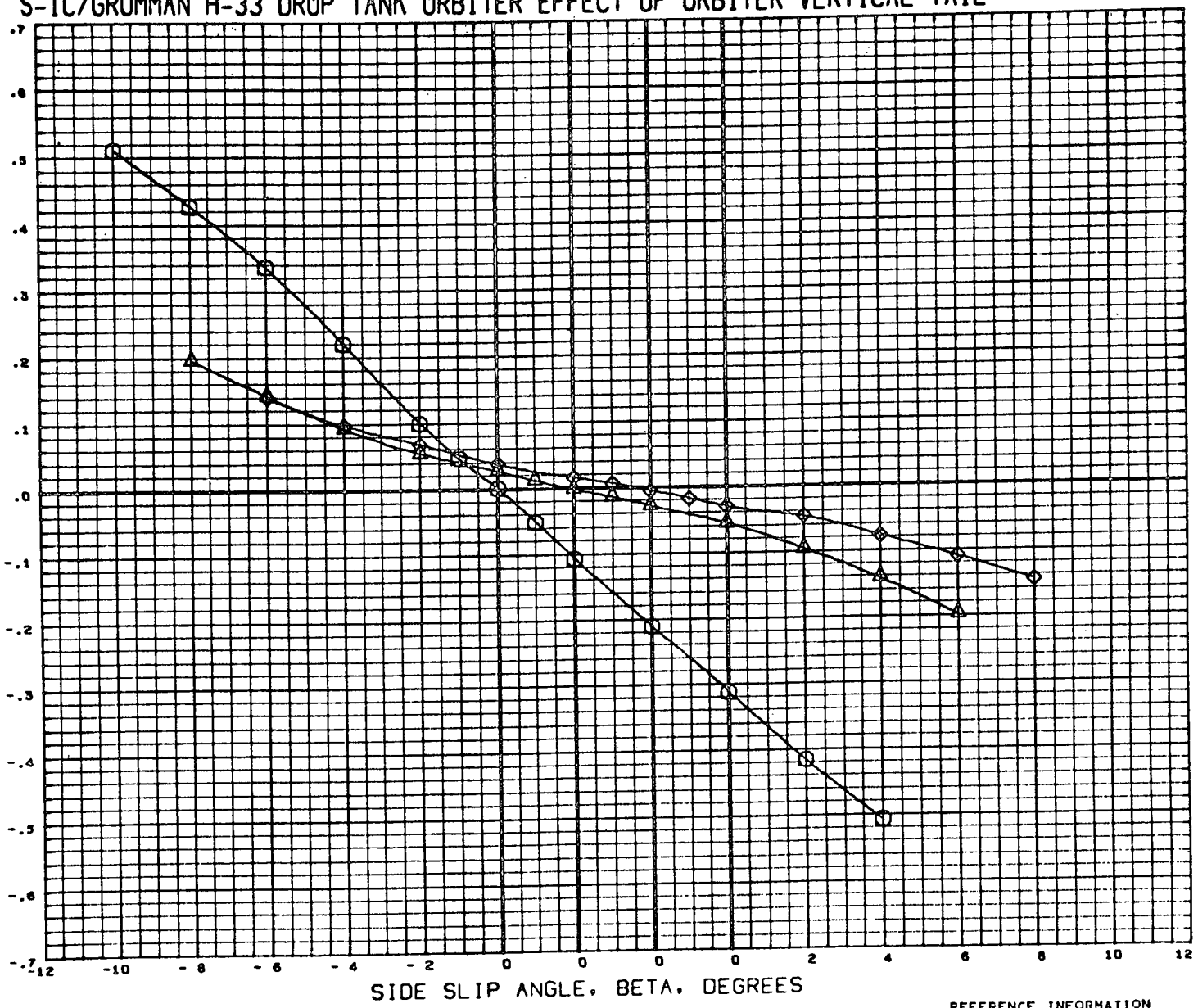
ALPHA 0.000 PHI 90.000

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



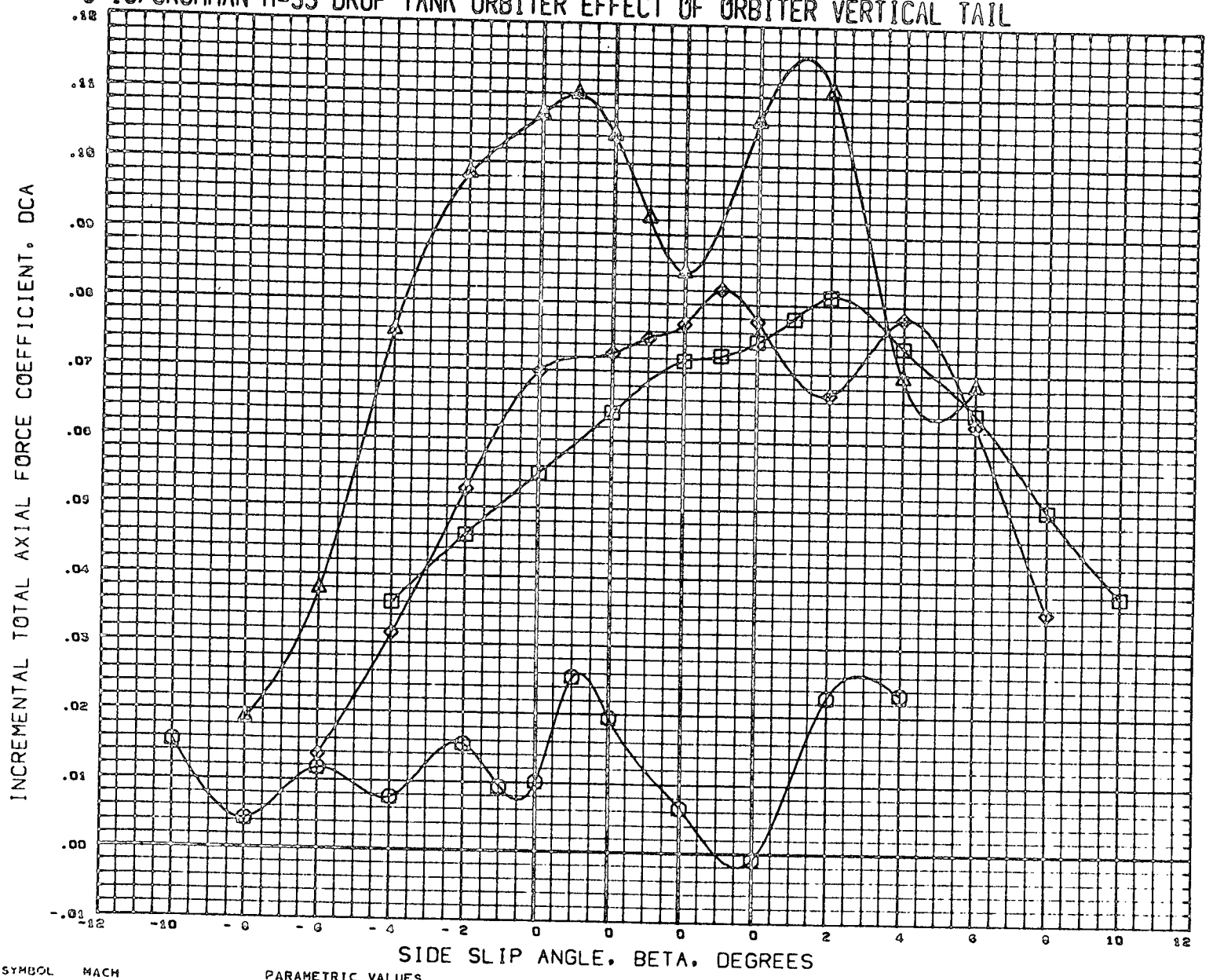
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	ALPHA	0.000	PHI	90.000
△	3.500				
◇	4.960				

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



SYMBOL	MACH
○	0.900
△	1.000
◇	1.100
□	1.200

PARAMETRIC VALUES

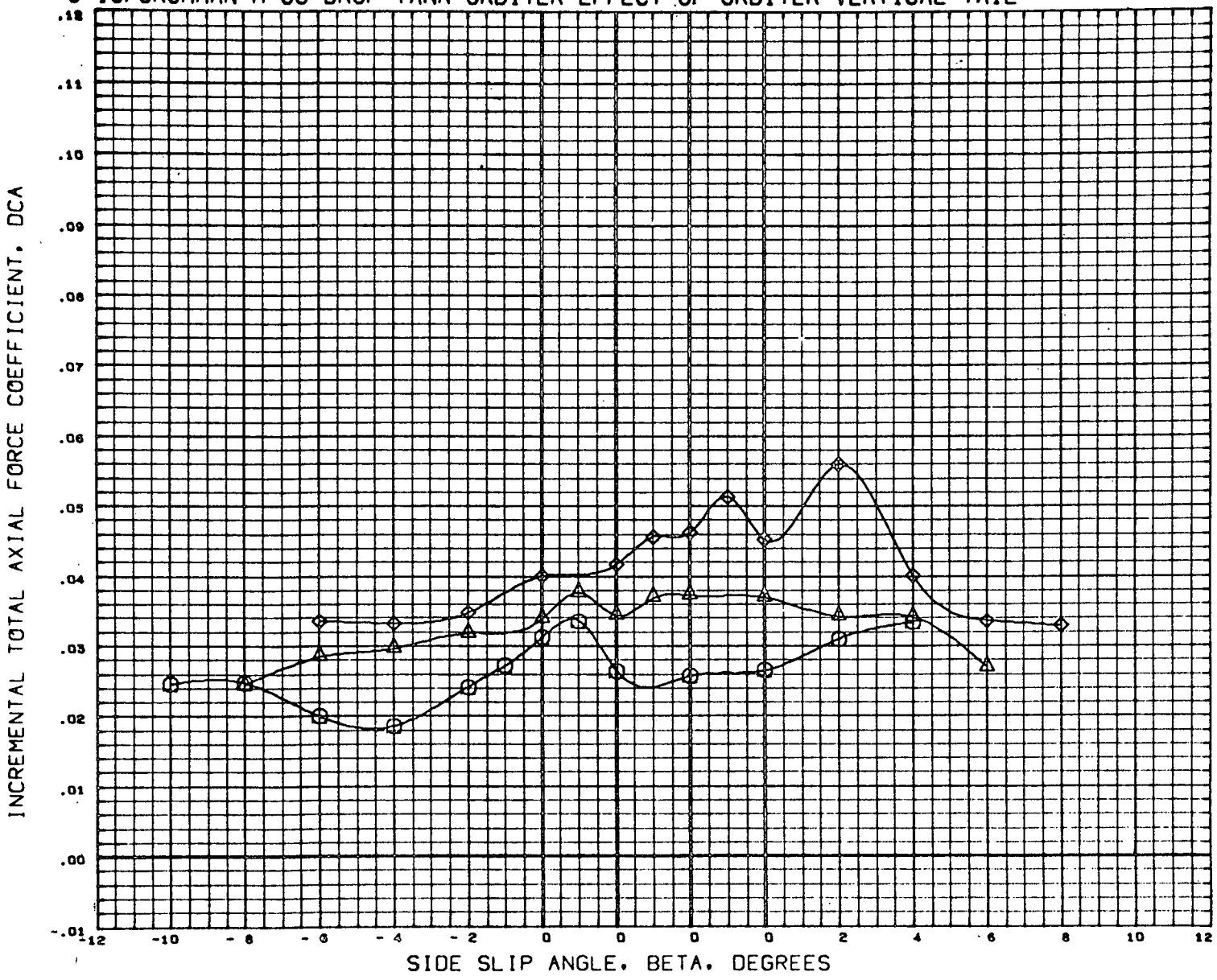
ALPHA 0.000 PHI 90.000

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL

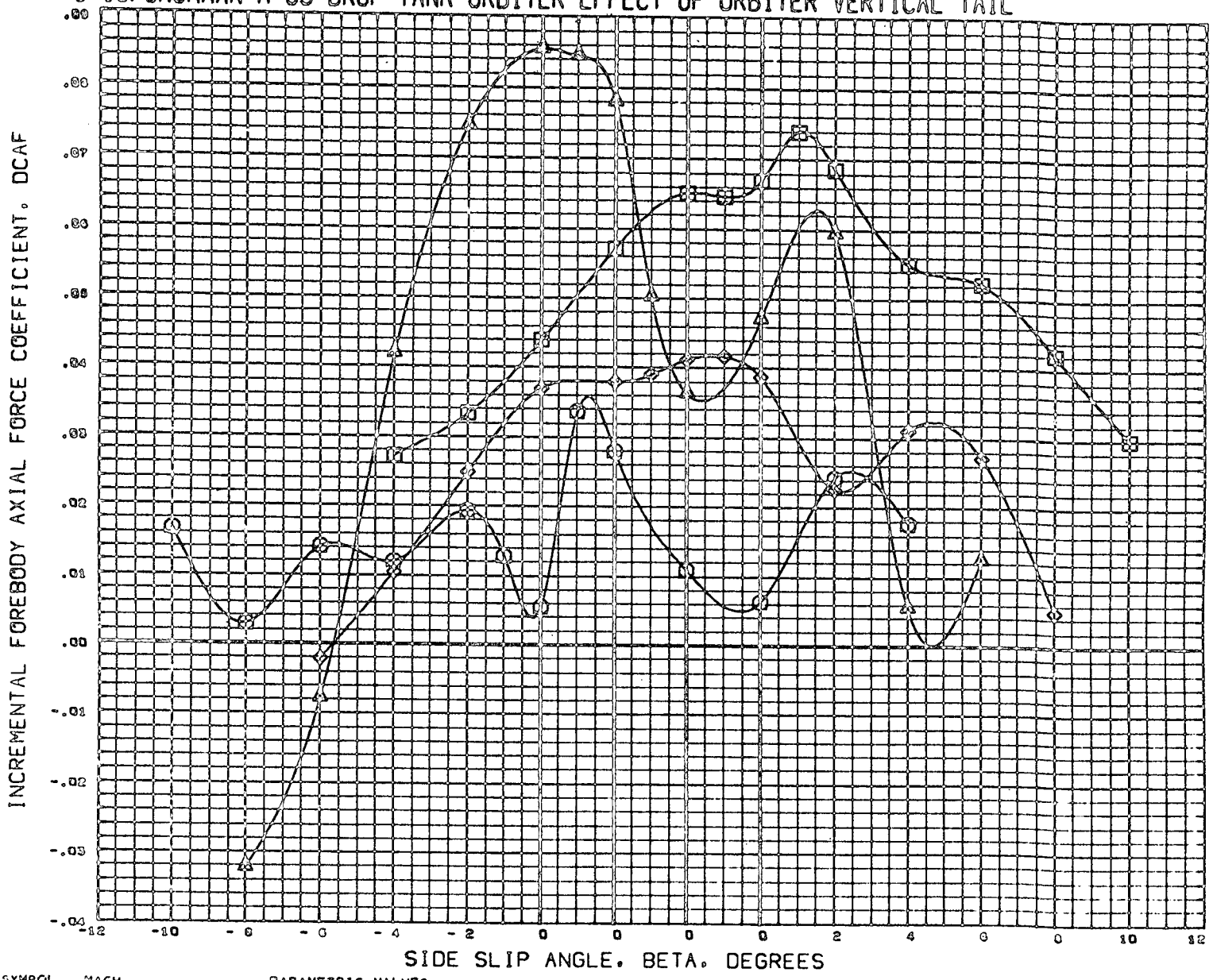


SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	ALPHA	0.000	PHI	90.000
△	3.500				
◇	4.960				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION		
SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



SYMBOL	MACH
○	0.900
△	1.000
◇	1.100
□	1.200

PARAMETRIC VALUES

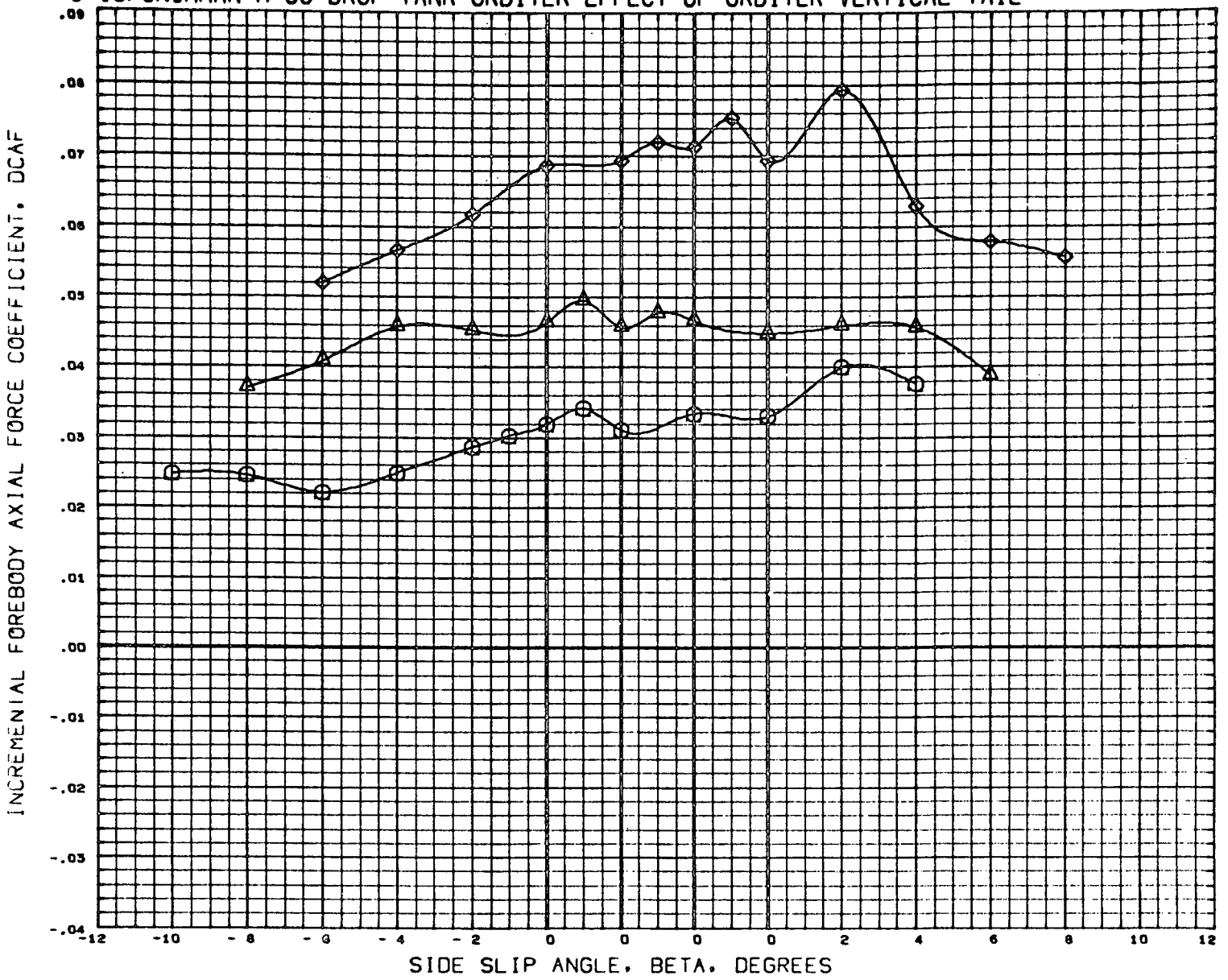
ALPHA 0.000 PHI 90.000

DATA MIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	9.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



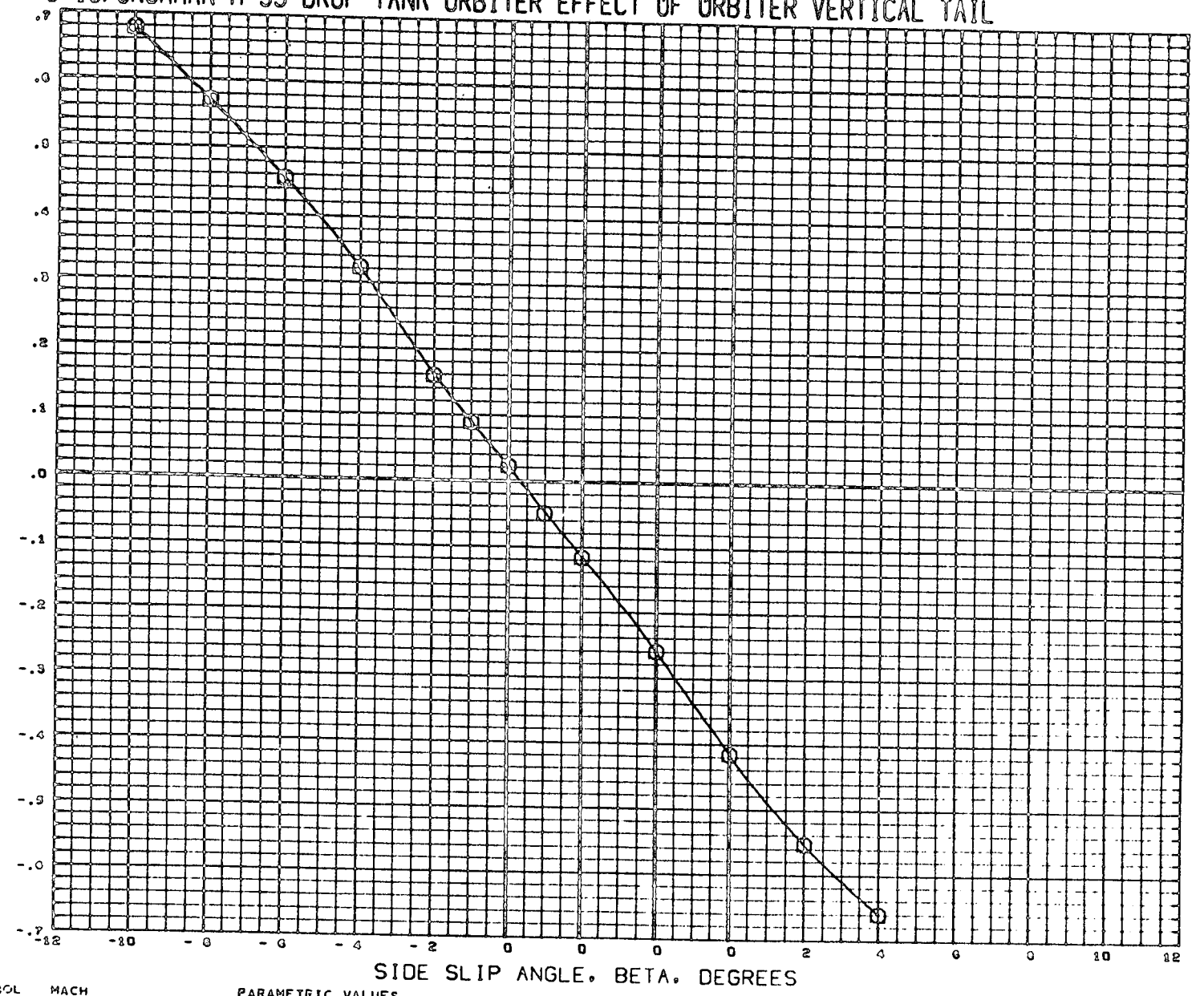
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	ALPHA	0.000	PHI	90.000
△	3.500				
◇	4.960				

DATA HIST. CODE *ACCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



SYMBOL MACH PARAMETRIC VALUES

○ 1.200 ALPHA 0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.3070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL

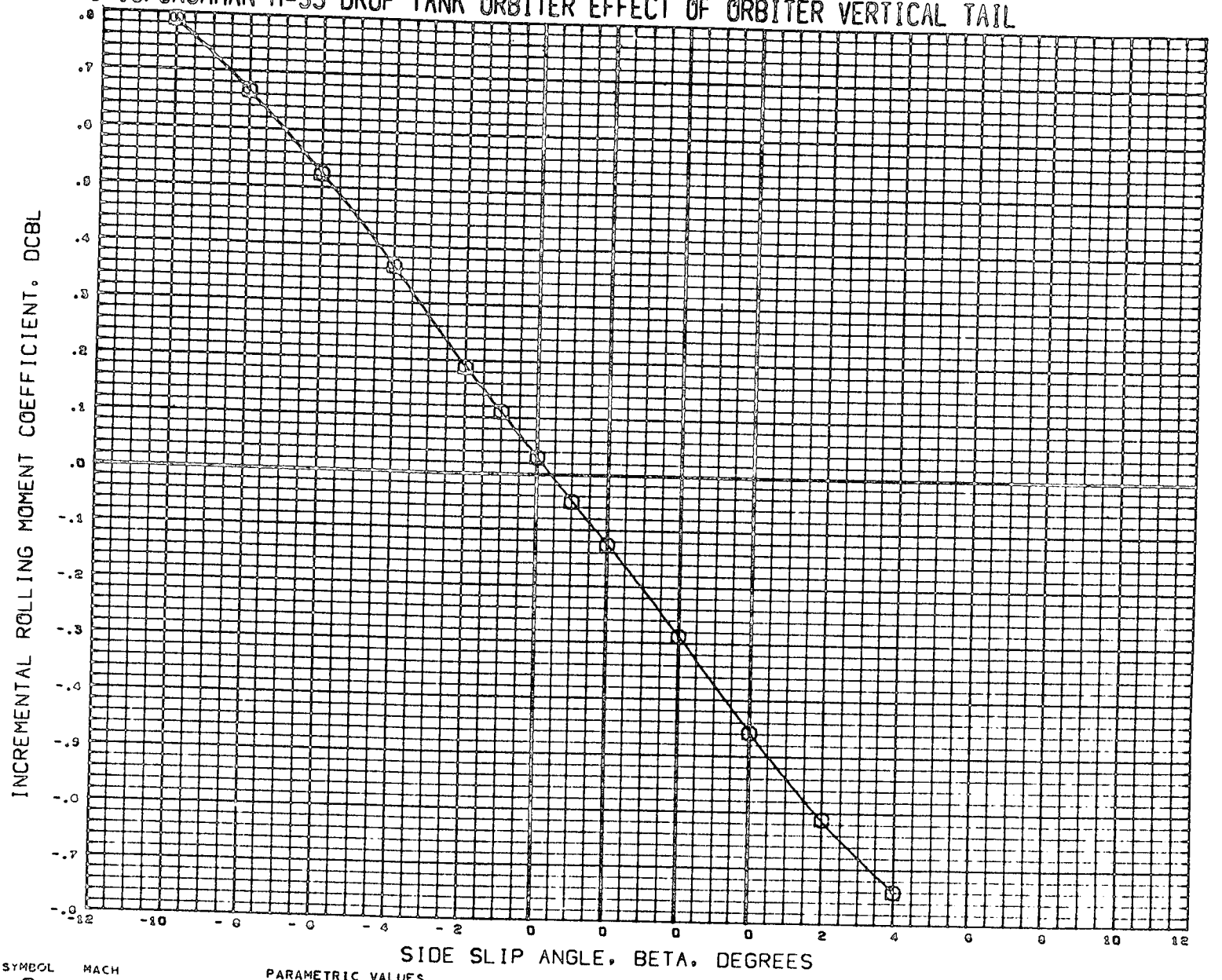
SYMBOL	MACH		PARAMETRIC VALUES
O	1.200	ALPHA	0.000

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



SYMBOL MACH PARAMETRIC VALUES

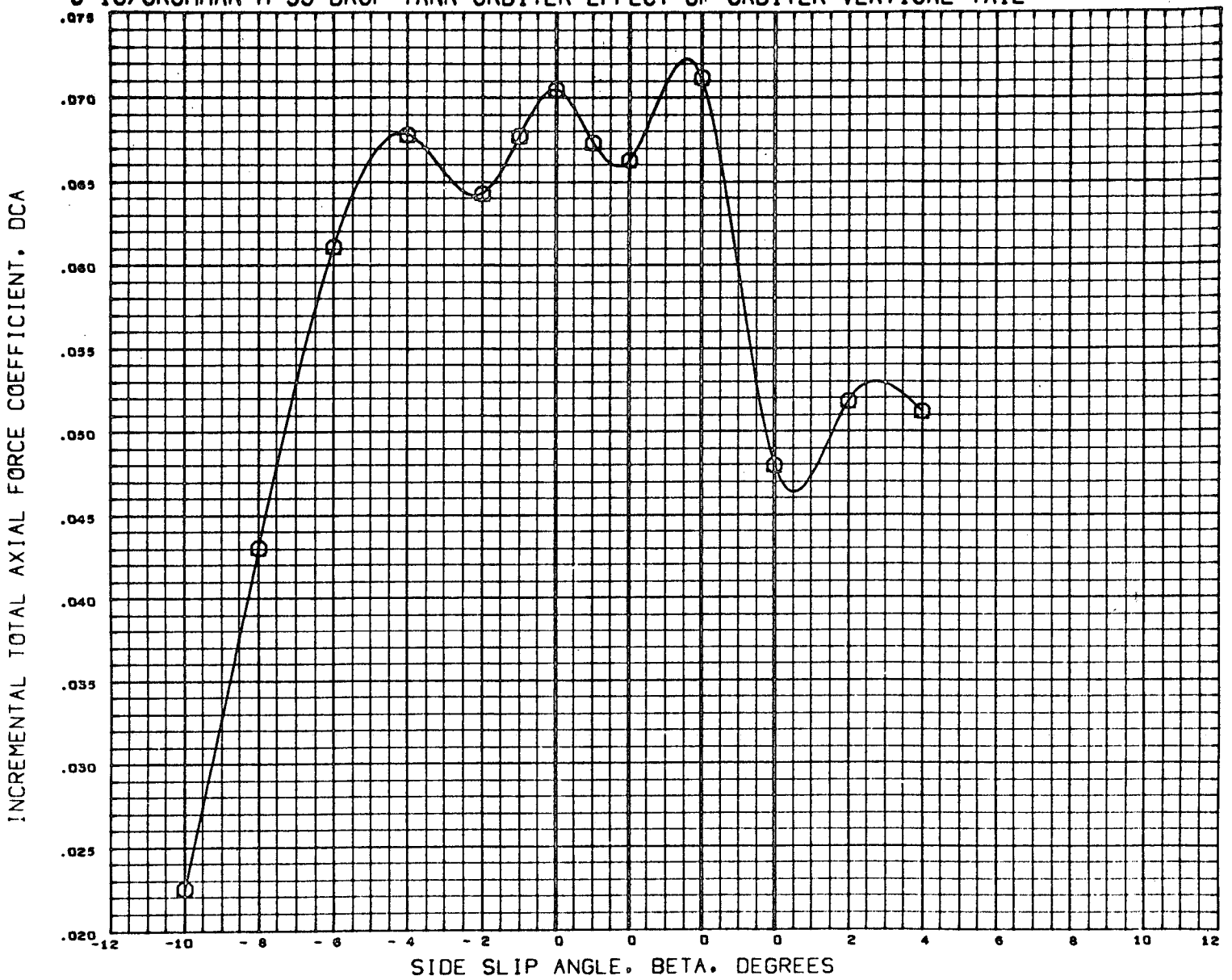
O 1.200 ALPHA 0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.9070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



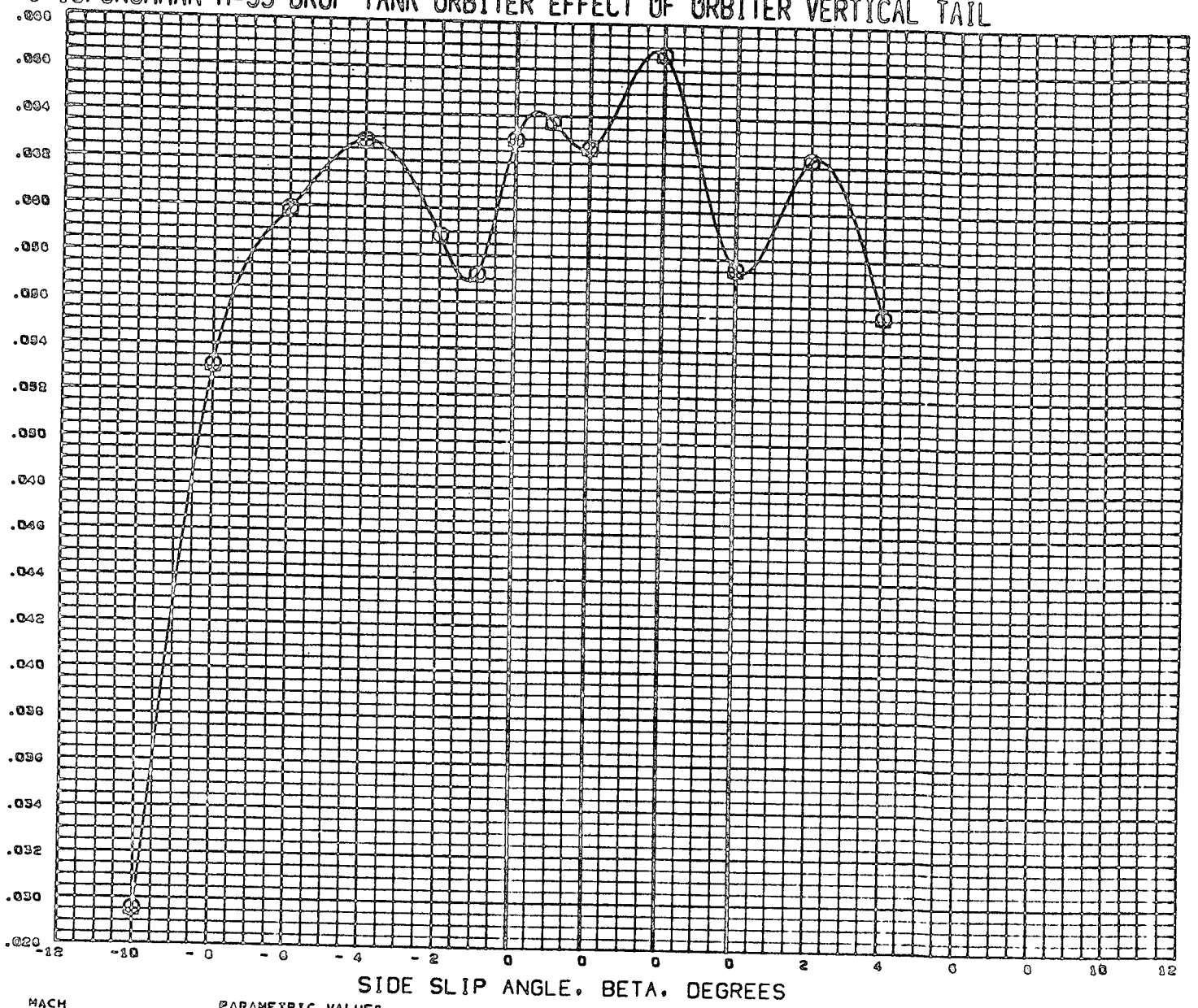
SYMBOL	MACH		PARAMETRIC VALUES
O	1.200	ALPHA	0.000

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



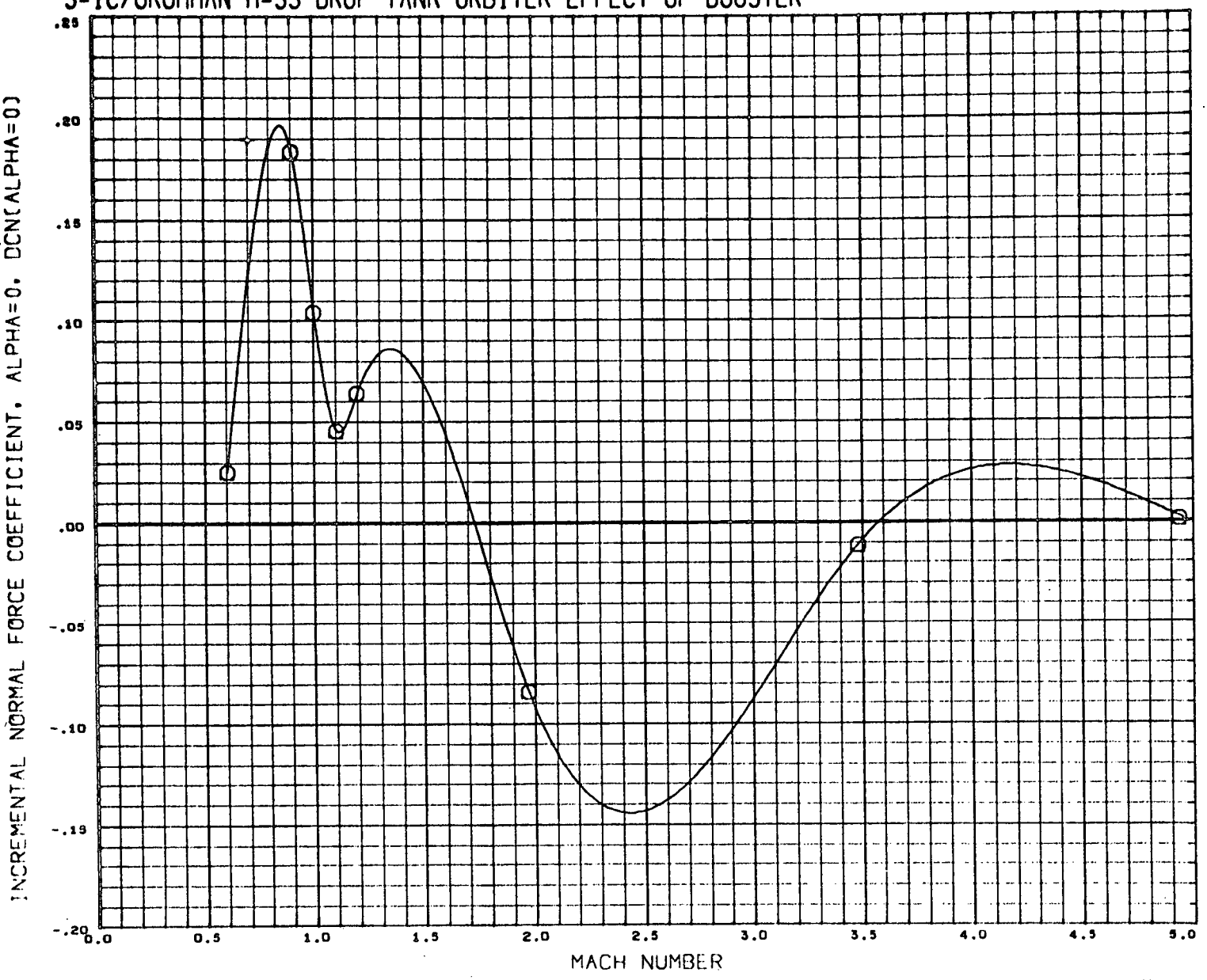
SYMBOL	MACH	PARAMETRIC VALUES
O	1.200	ALPHA 0.000

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	9.9070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



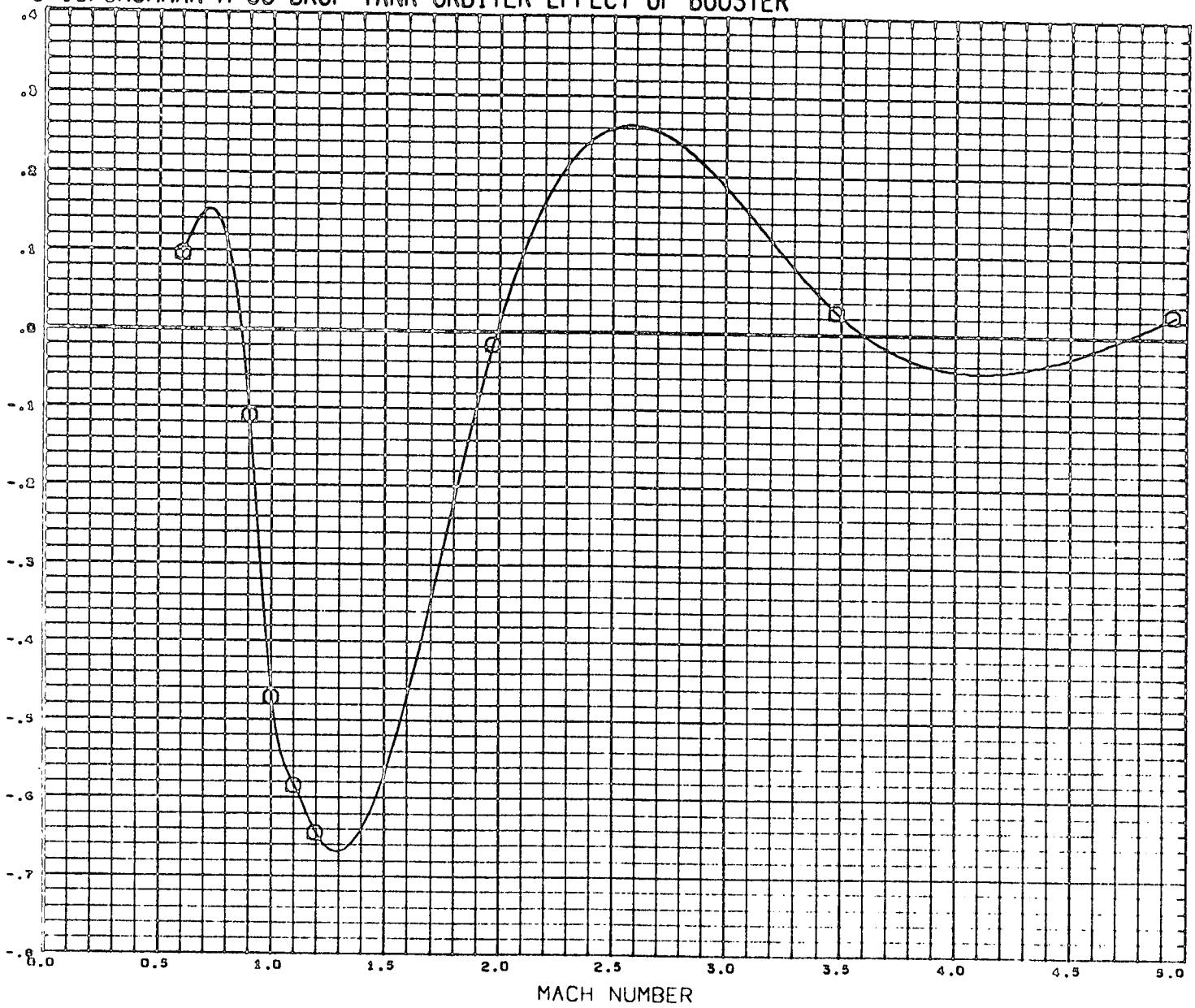
SYMBOL	ALPHA		PARAMETRIC VALUES
○	0.000	BETA	0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE ⟨CCCGC1⟩*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



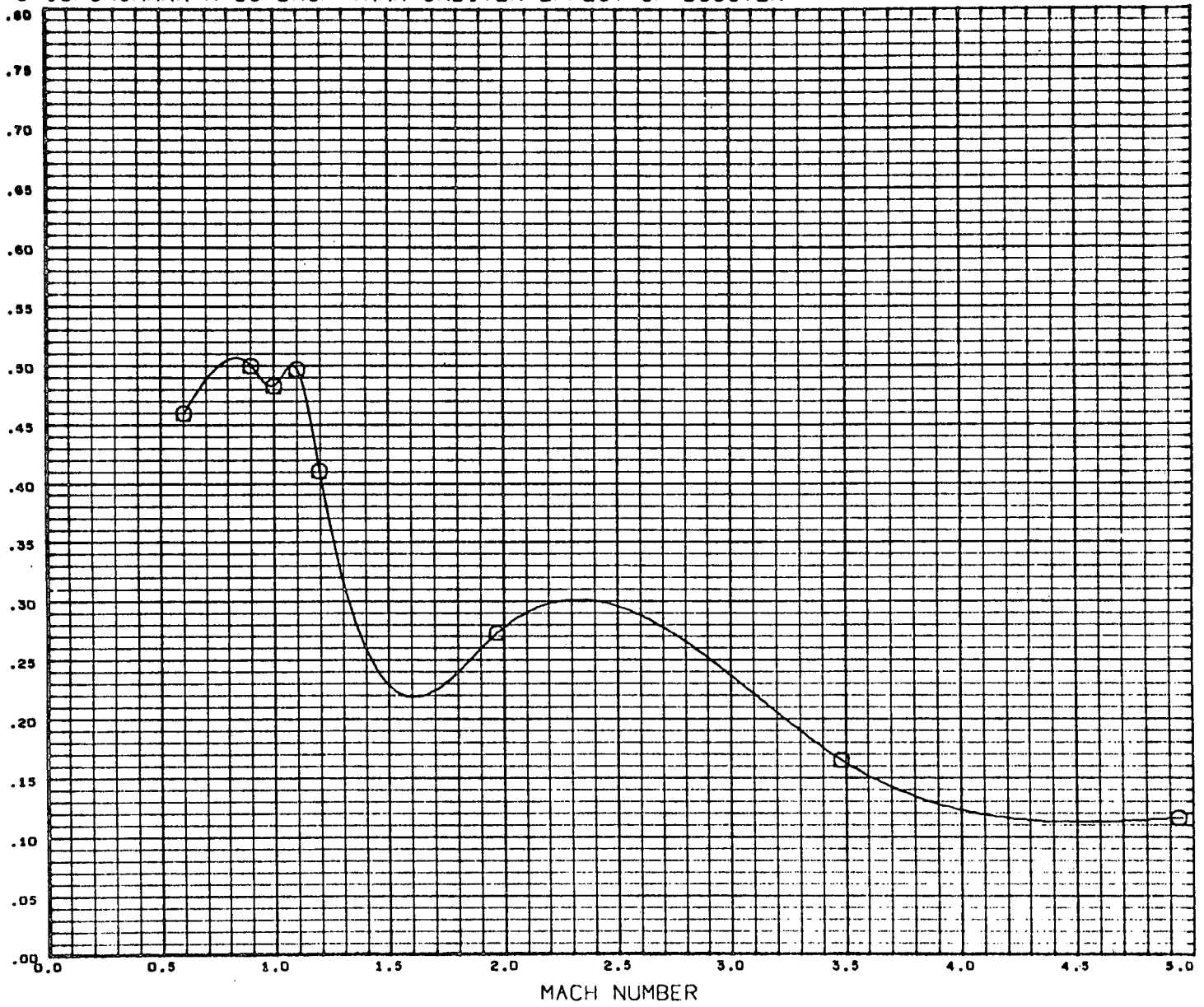
SYMBOL ALPHA PARAMETRIC VALUES
○ 0.000 BETA 0.000

DATA HIST. CODE CCBGBII#C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



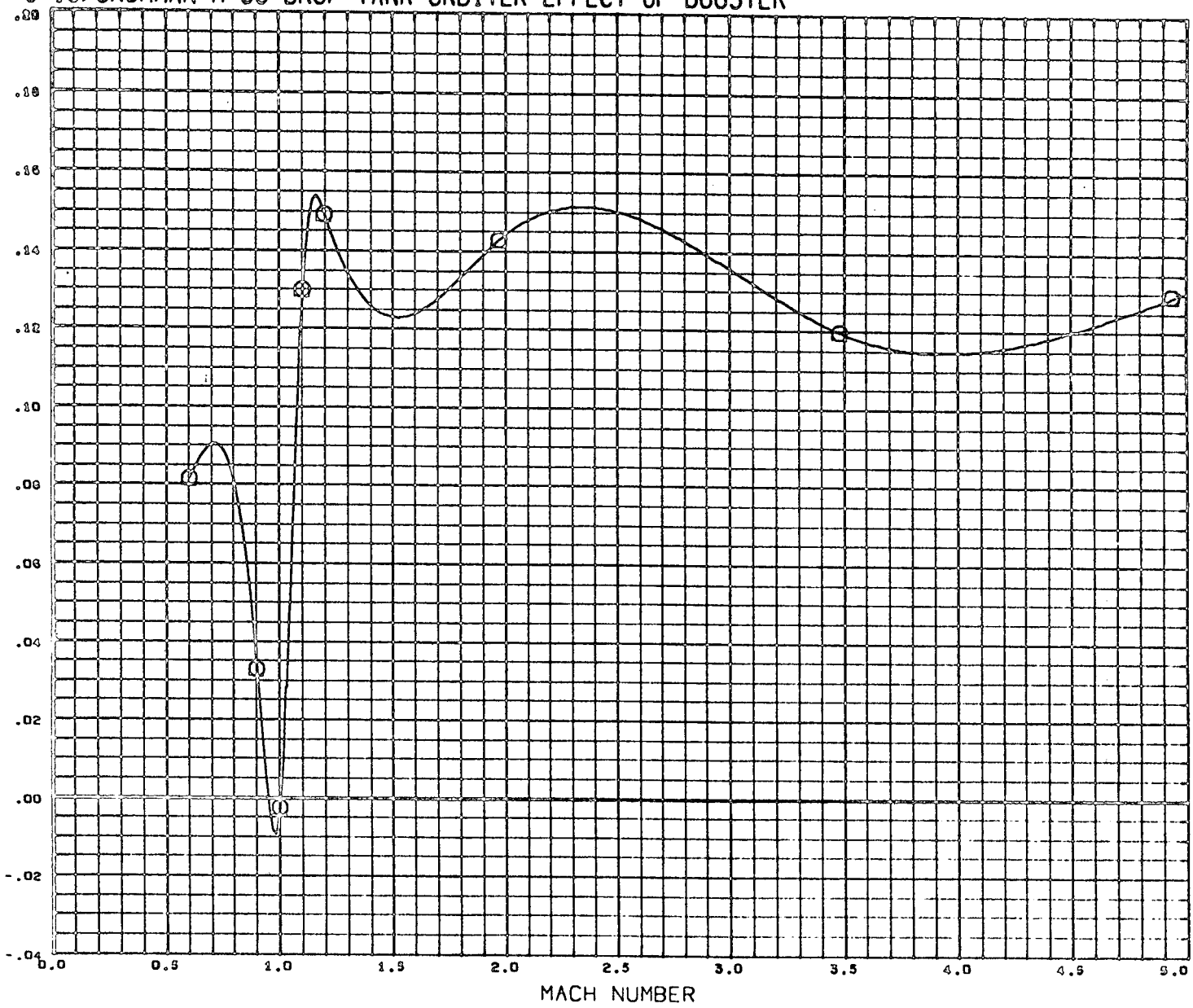
SYMBOL	ALPHA		PARAMETRIC VALUES
O	0.000	BETA	0.000

DATA HIST. CODE CCCGC114C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



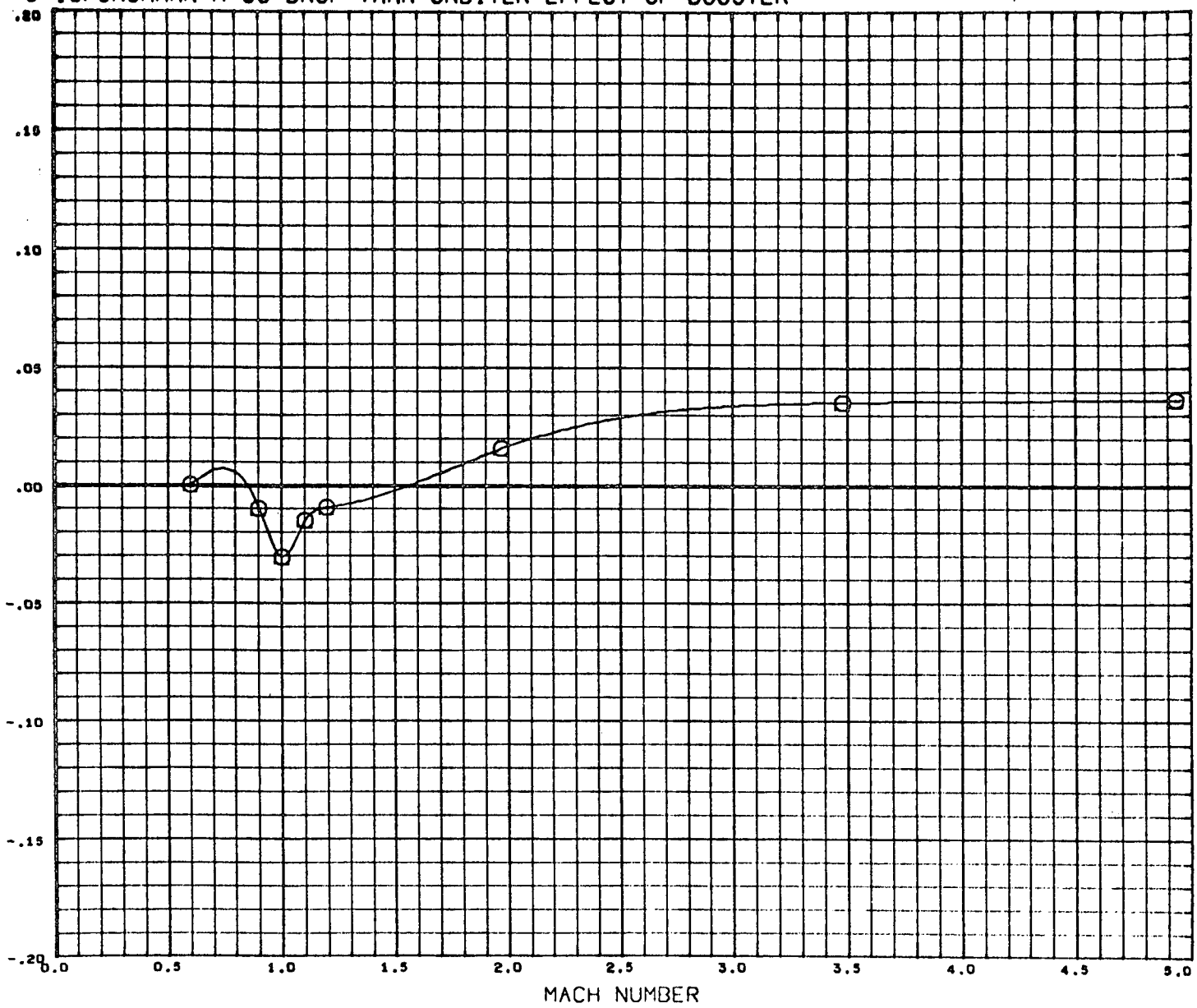
SYMBOL	ALPHA		PARAMETRIC VALUES
○	0.000	BETA	0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC11#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



SYMBOL ALPHA PARAMETRIC VALUES

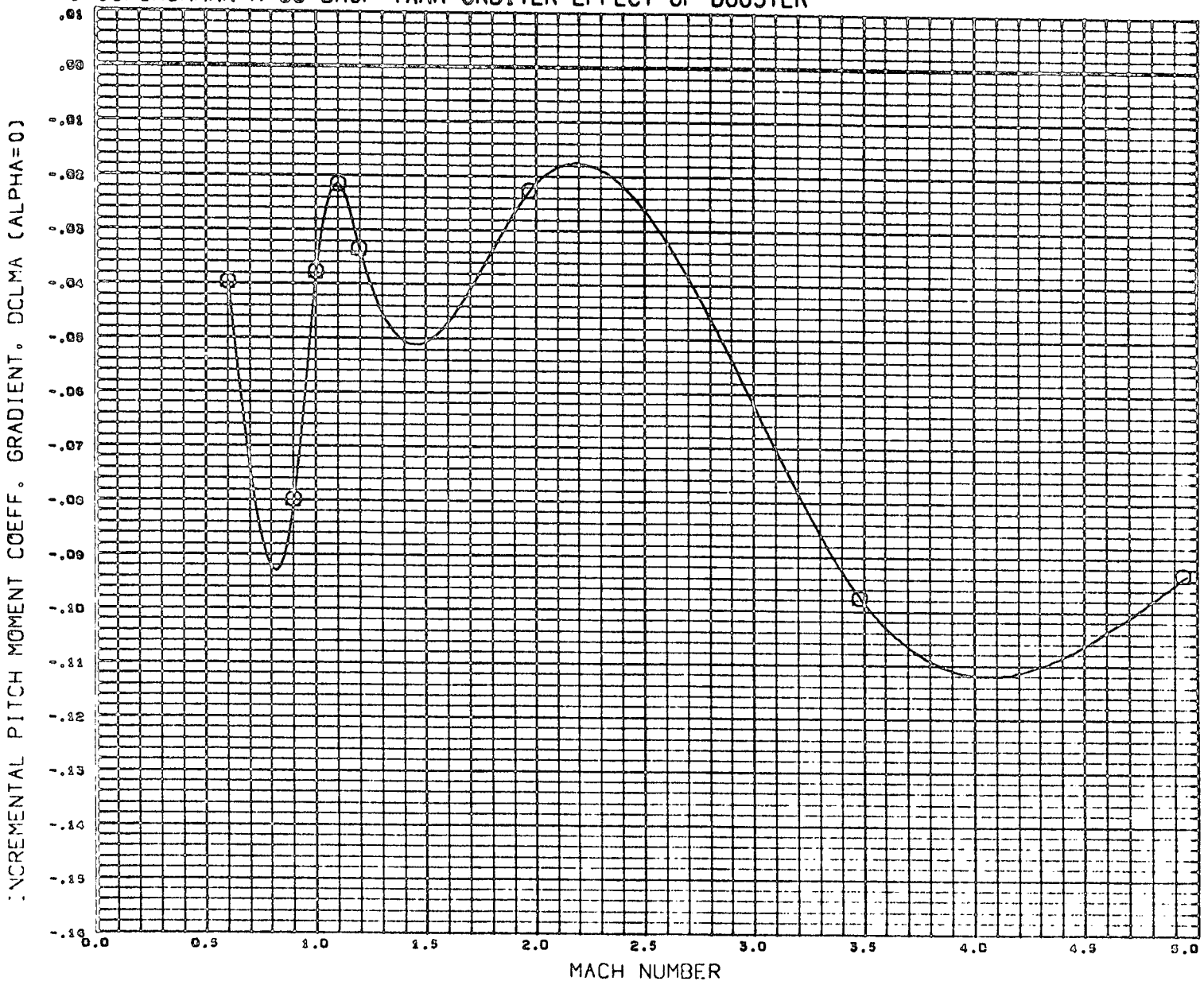
() 0.000 BETA 0.000

DATA HIST. CODE CCCGCII#C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



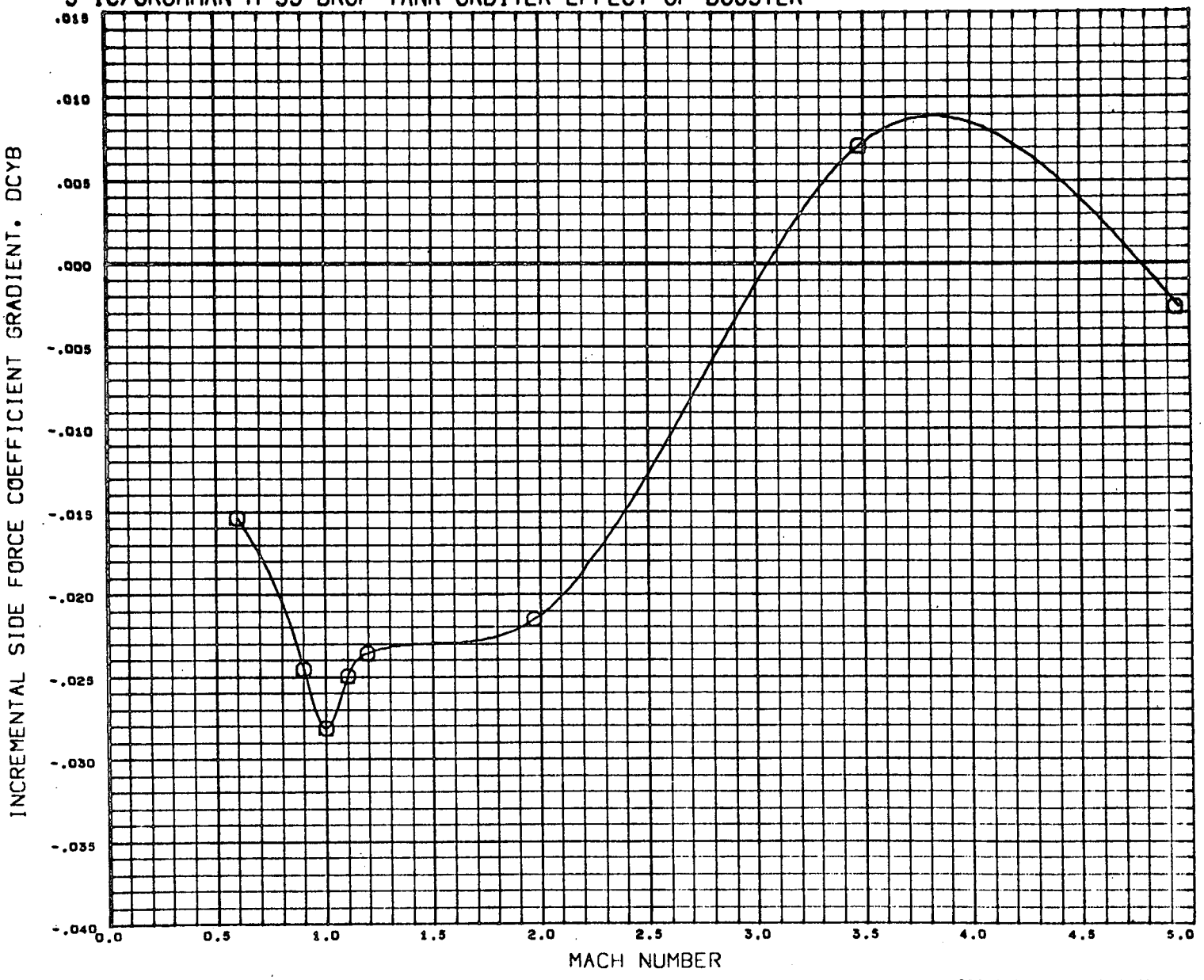
SYMBOL	ALPHA		PARAMETRIC VALUES
()	0.000	BETA	0.000

DATA HIST. CODE CCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3980	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



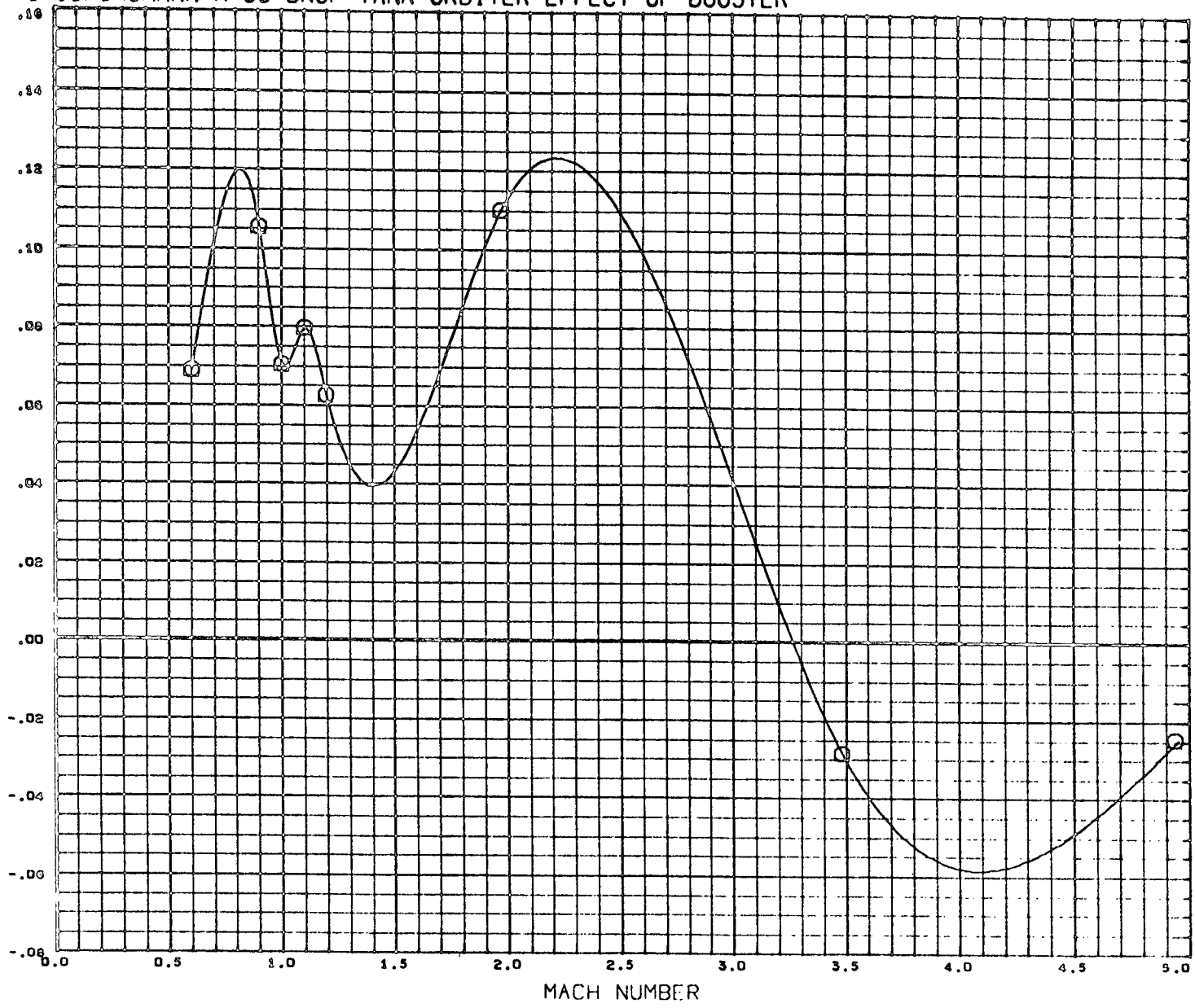
SYMBOL	BETA		PARAMETRIC VALUES
O	0.000	ALPHA	0.000

DATA HIST. CODE *ACCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



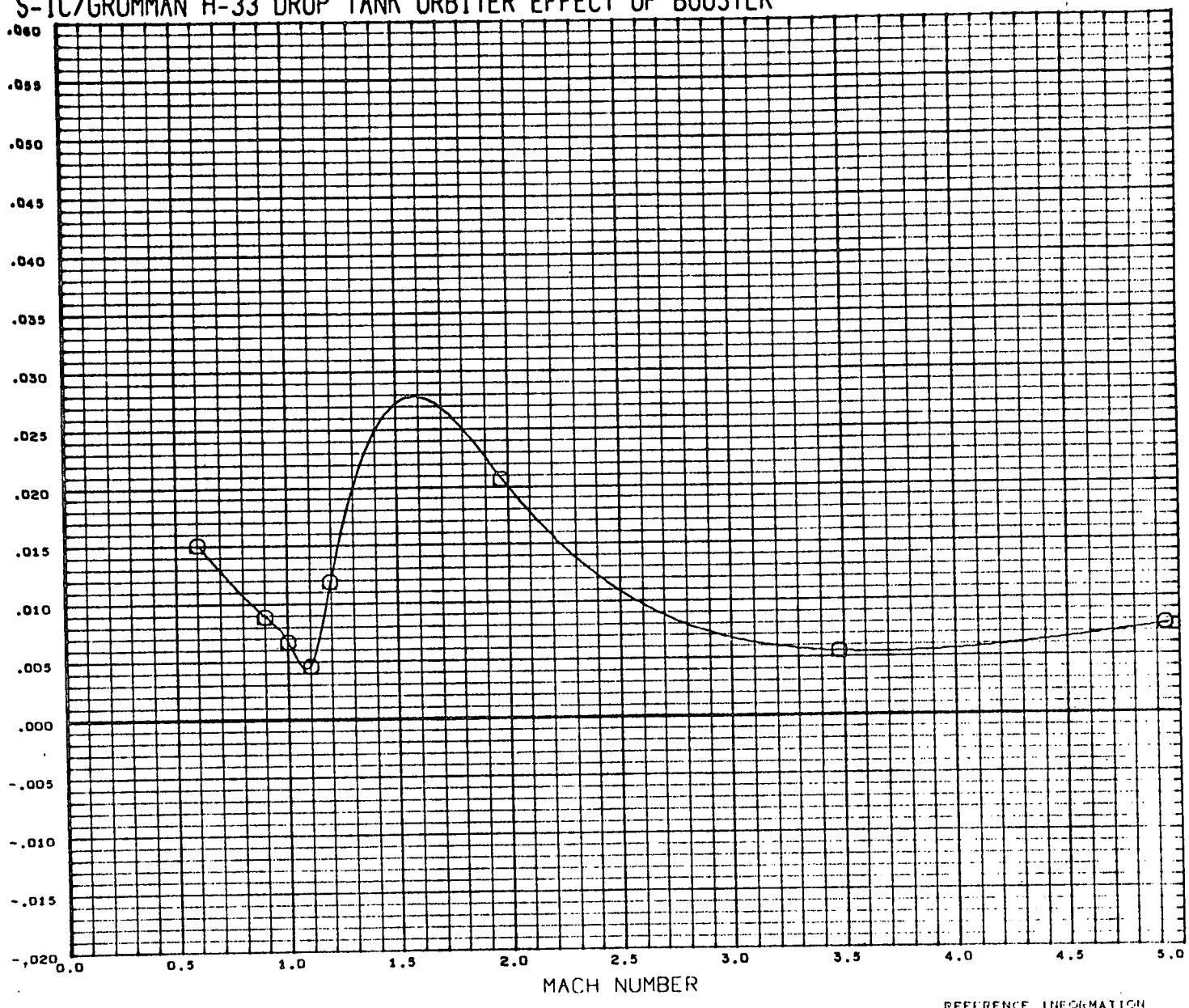
SYMBOL	BETA		PARAMETRIC VALUES
○	0.000	ALPHA	0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCGCII*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



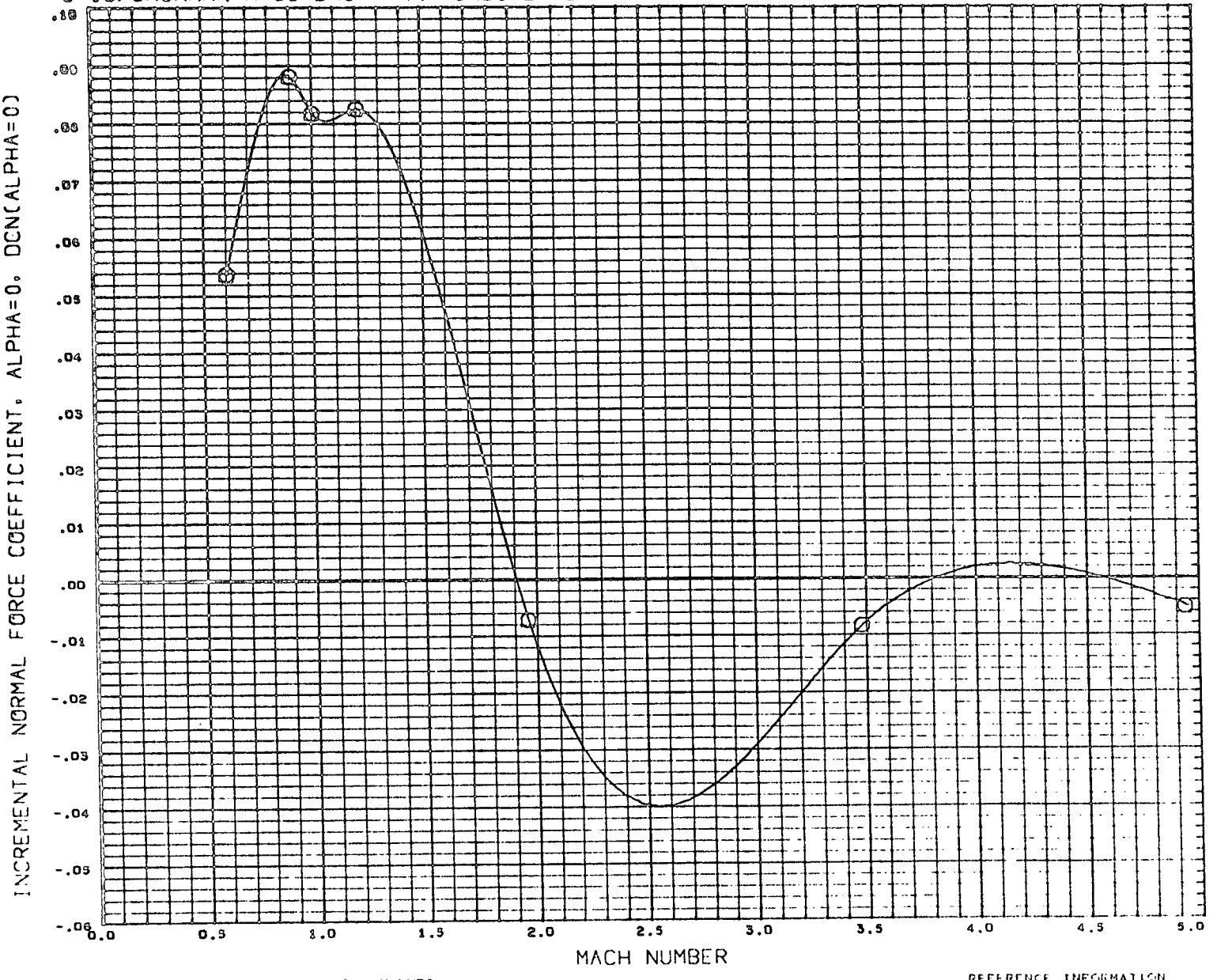
SYMBOL	PARAMETRIC VALUES		
	BETA		ALPHA
O	0.000		0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCGCII*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



SYMBOL	ALPHA		PARAMETRIC VALUES		
○	0.000	BETA	0.000	PHI	0.000

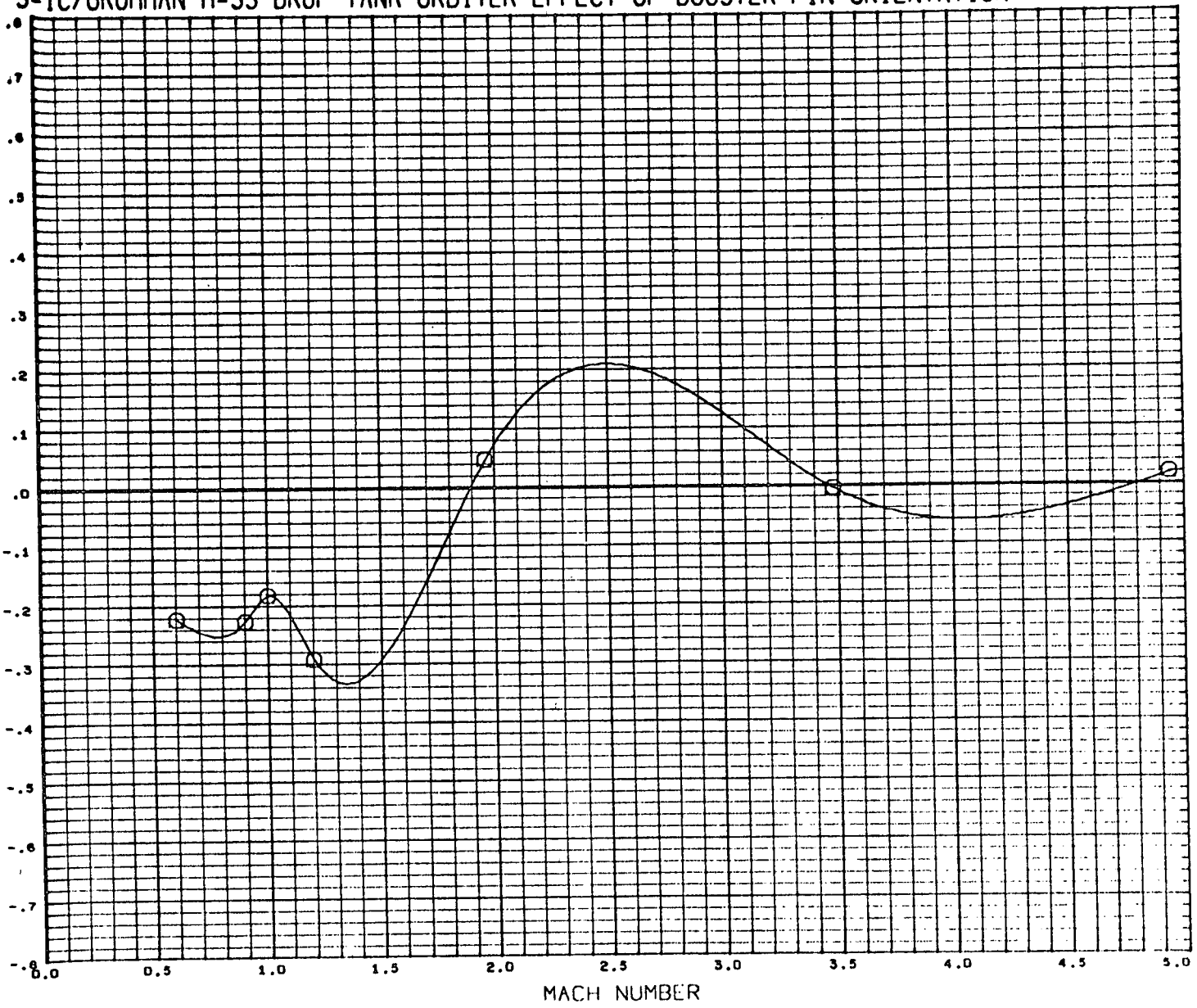
REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCIIPC

M502 MSFC-S1C INCREMENTAL DATA(OWVTCBF-OWVTCBF1) (544041) 12 MAY 72 PAGE 470

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



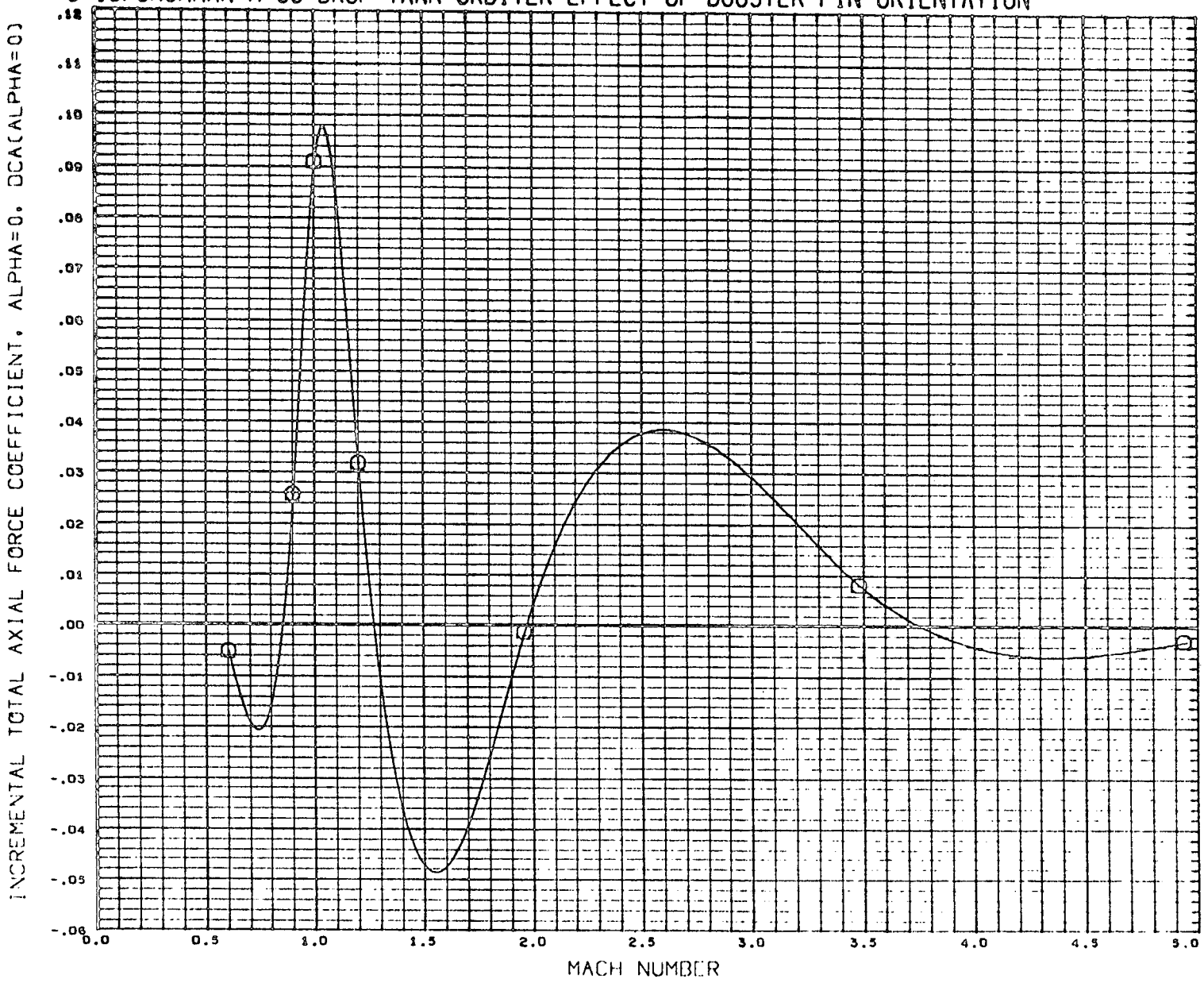
SYMBOL	ALPHA		PARAMETRIC VALUES		
()	0.000	BETA	0.000	PHI	0.000

DATA HIST. CODE CCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



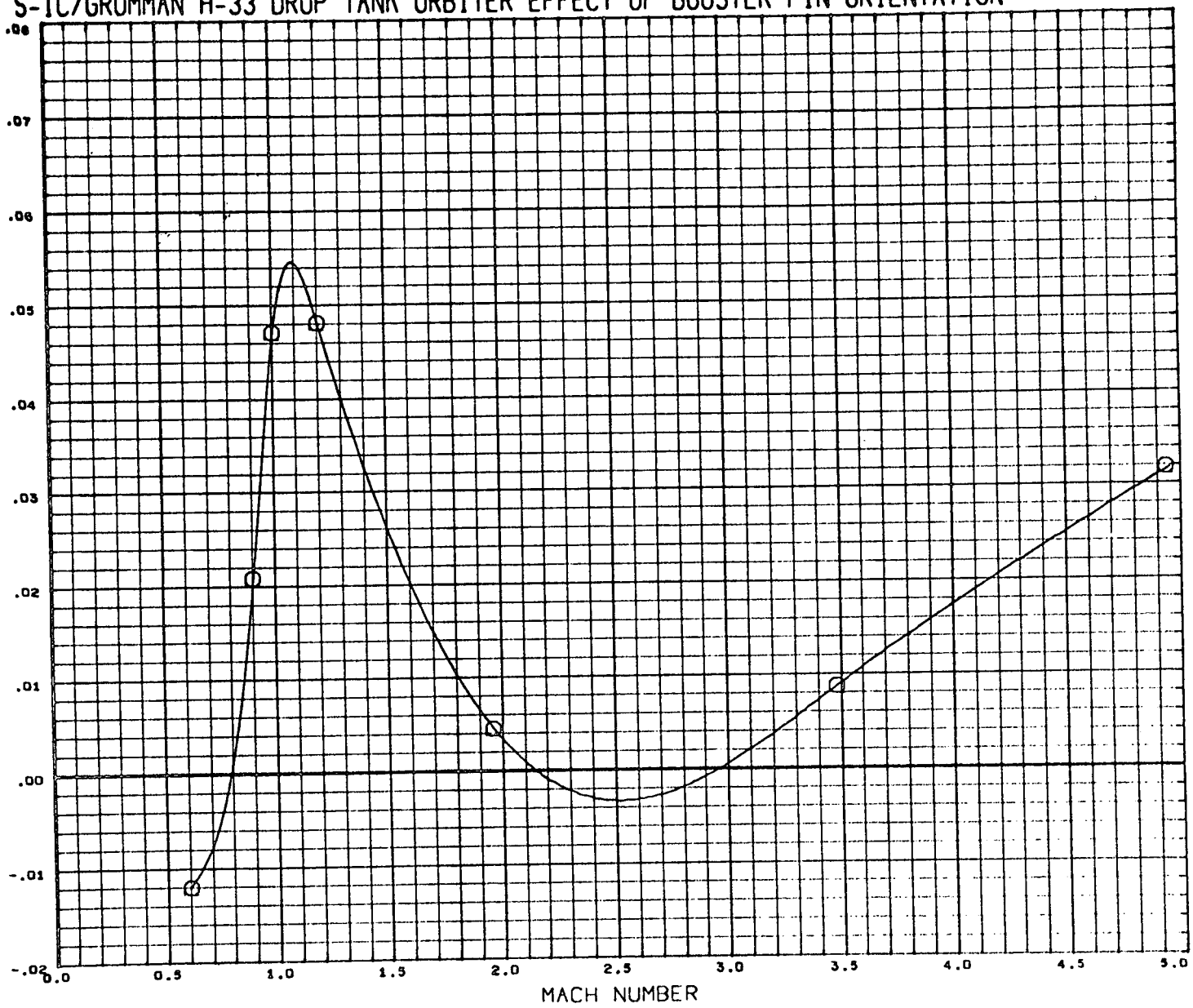
SYMBOL	ALPHA		PARAMETRIC VALUES		
○	0.000	BETA	0.000	PHI	0.000

DATA HIST. CODE CCCGCIIPC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



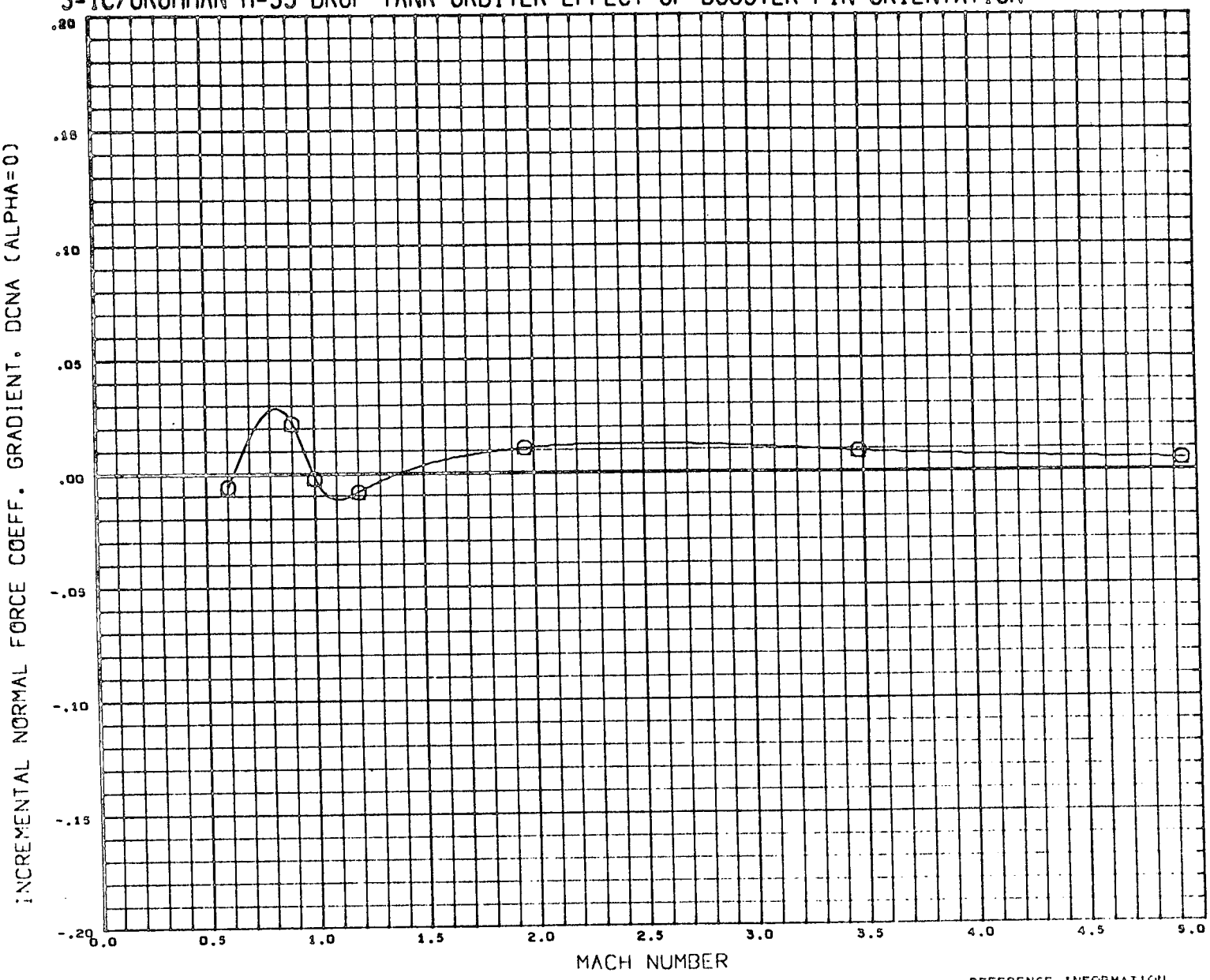
SYMBOL	ALPHA		PARAMETRIC VALUES		
○	0.000	BETA	0.000	PHI	0.000

DATA HIST. CODE CCCGCIIAC

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



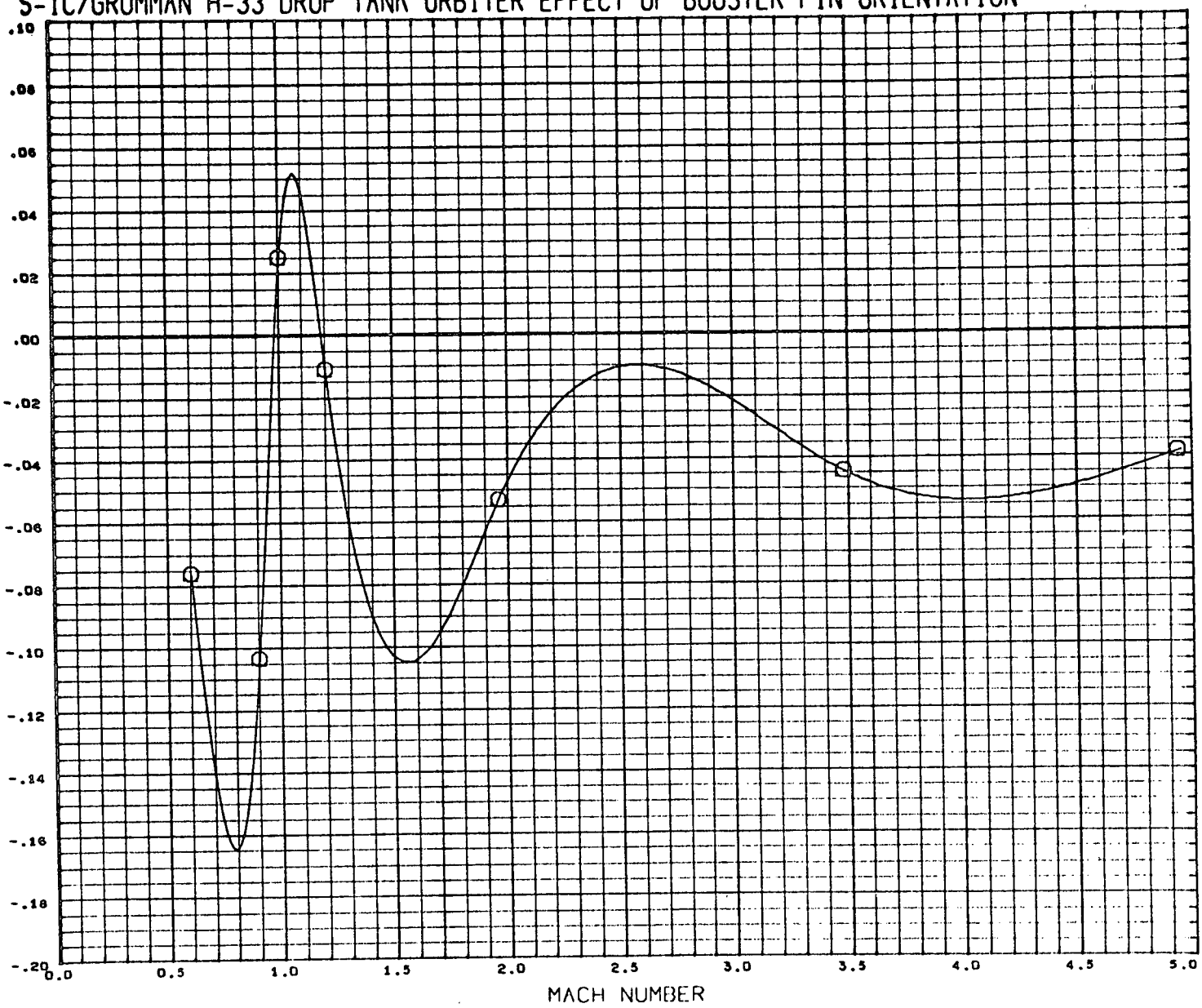
SYMBOL	ALPHA		PARAMETRIC VALUES		
O	0.000	BETA	0.000	PHI	0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCII*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



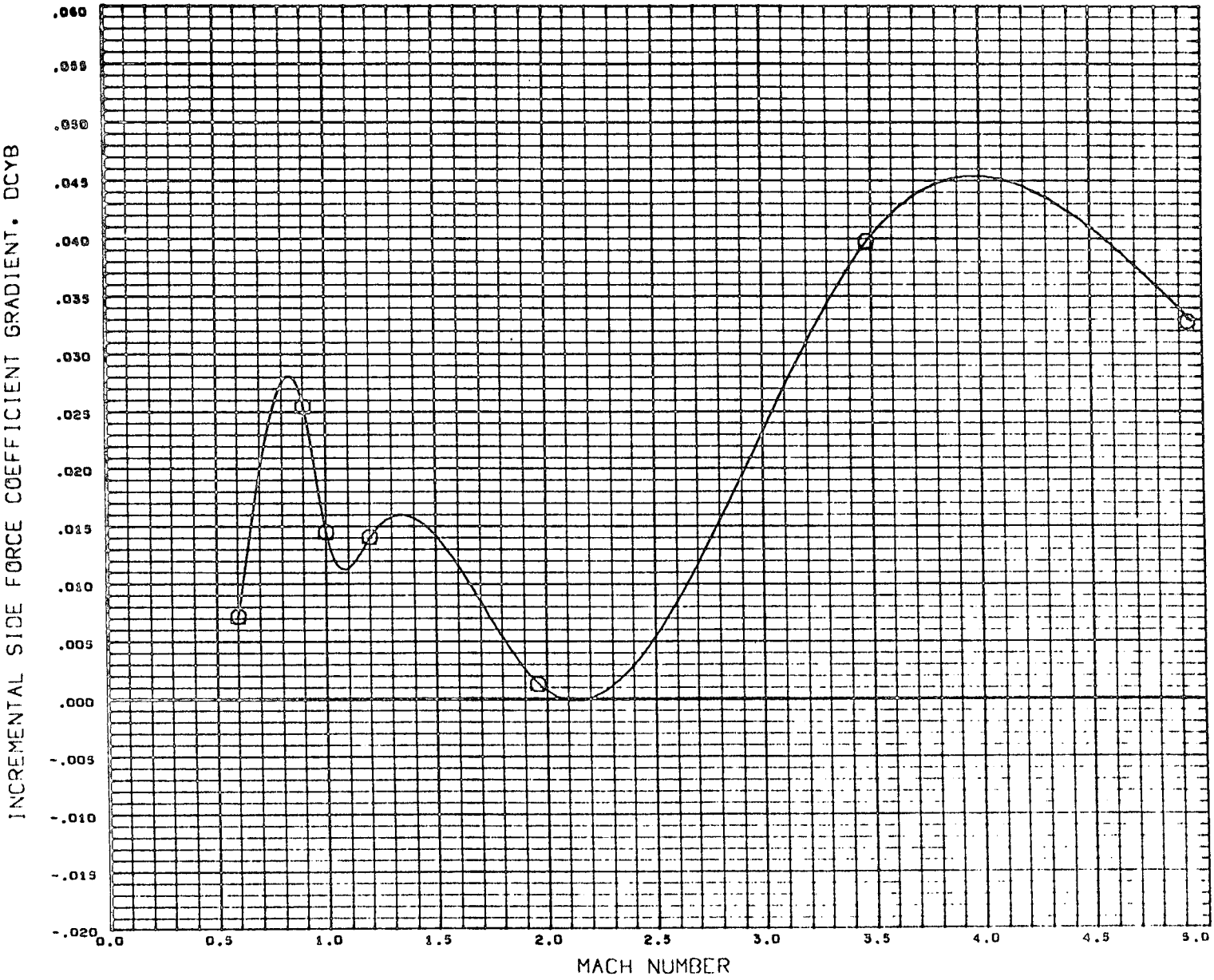
SYMBOL	ALPHA		PARAMETRIC VALUES		
○	0.000	BETA	0.000	PHI	0.000

DATA HIST. CODE CCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



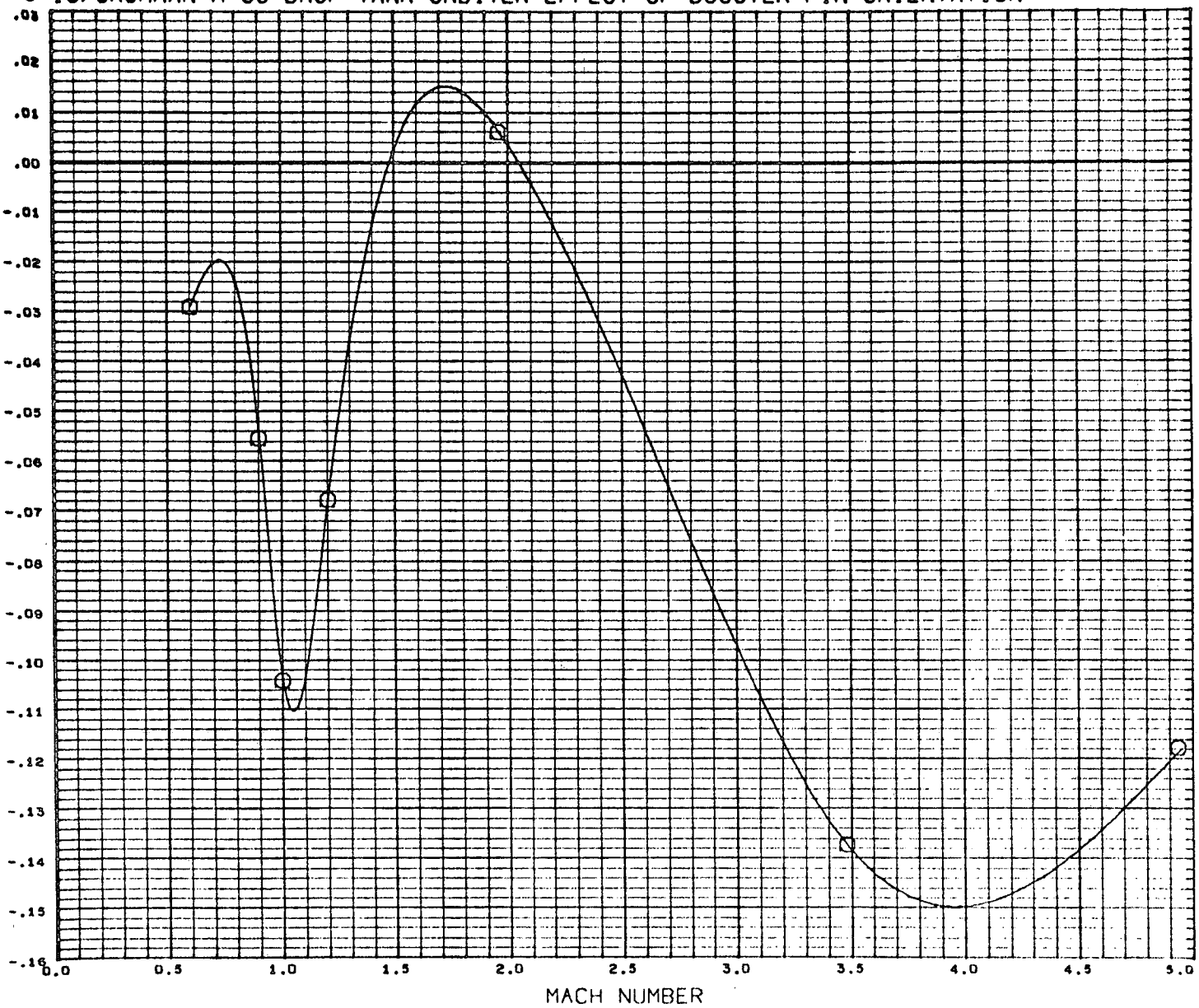
SYMBOL	BETA		PARAMETRIC VALUES		
○	0.000	ALPHA	0.000	PHI	90.000

DATA HIST. CODE *ACCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



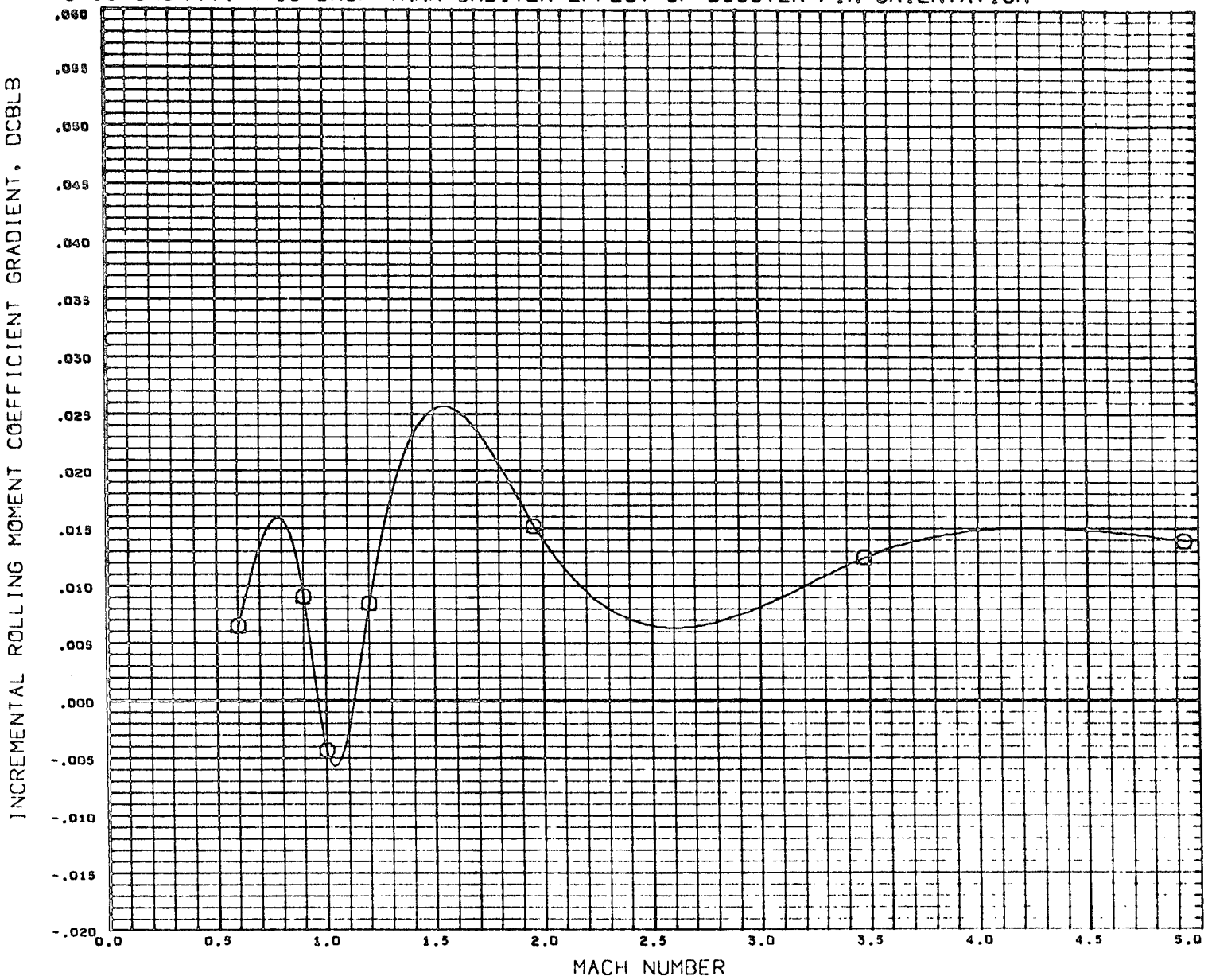
SYMBOL	BETA		PARAMETRIC VALUES		
○	0.000	ALPHA	0.000	PHI	90.000

DATA HIST. CODE #ACCCGCII#C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



SYMBOL BETA PARAMETRIC VALUES

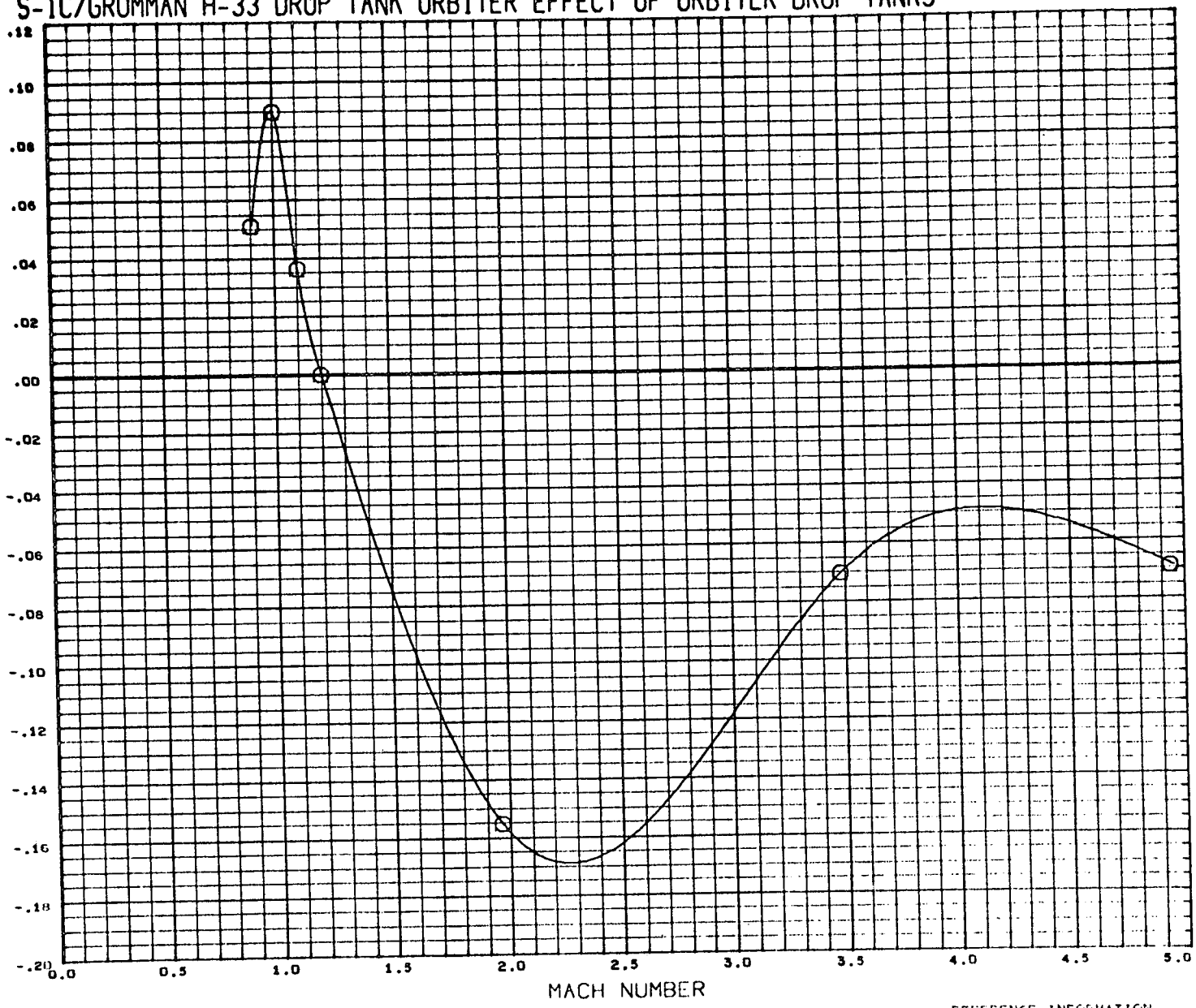
() 0.000 ALPHA 0.000 PHI 90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCGC11*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



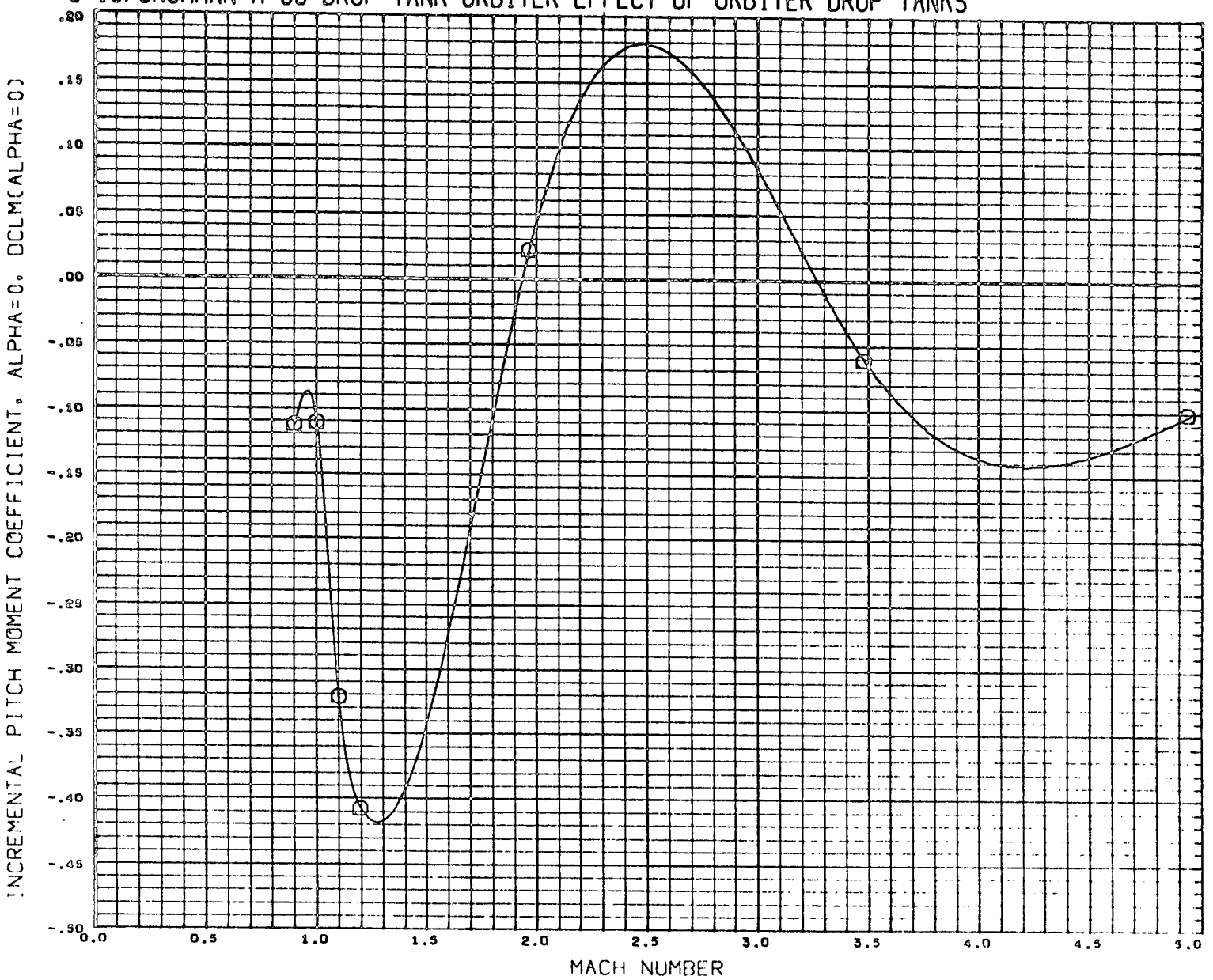
SYMBOL	ALPHA		PARAMETRIC VALUES		
○	0.000	BETA	0.000	PHI	0.000

DATA HIST. CODE CCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



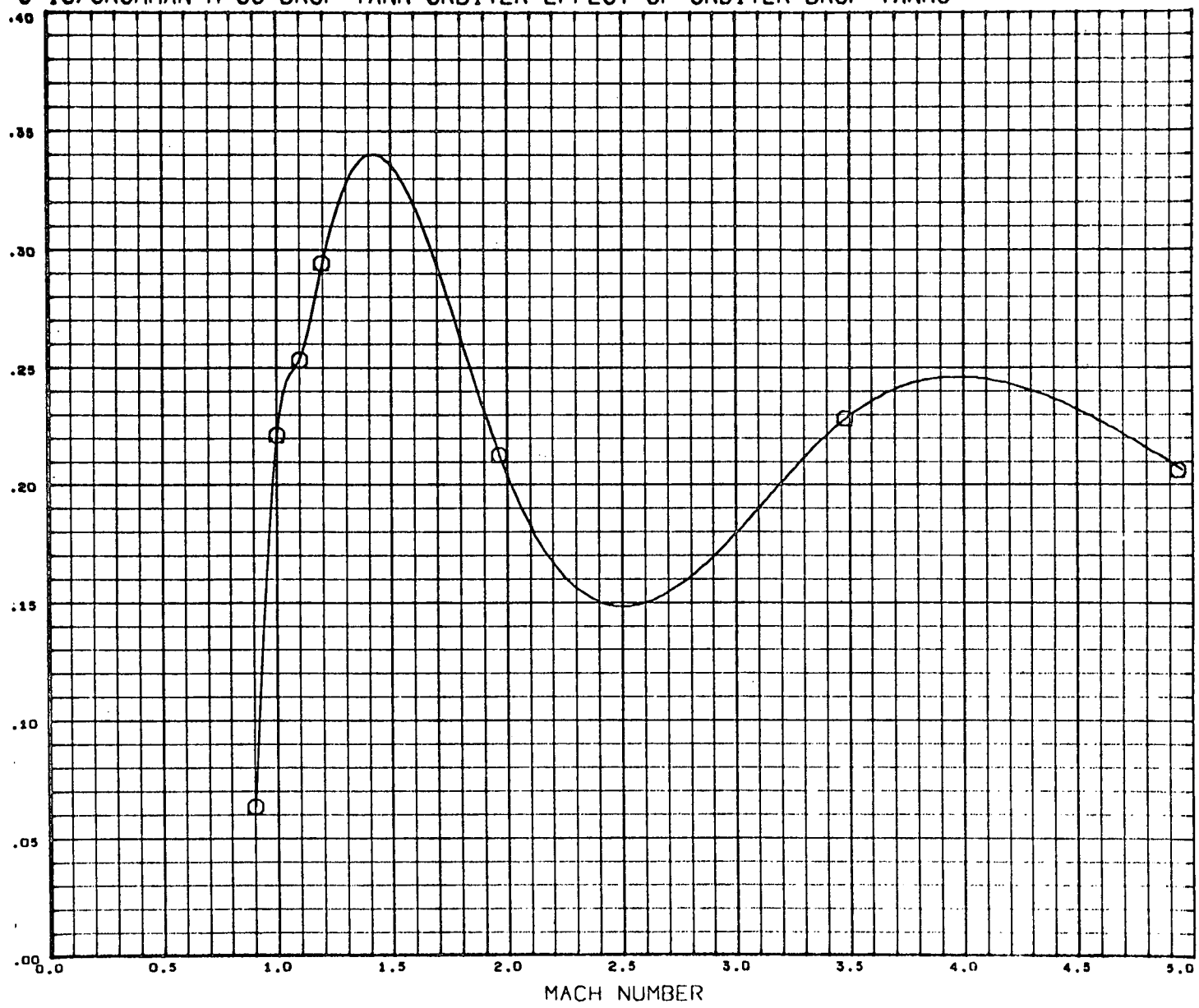
SYMBOL	ALPHA		PARAMETRIC VALUES		
O	0.000	BETA	0.000	PHI	0.000

DATA HIST. CODE CCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3900	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



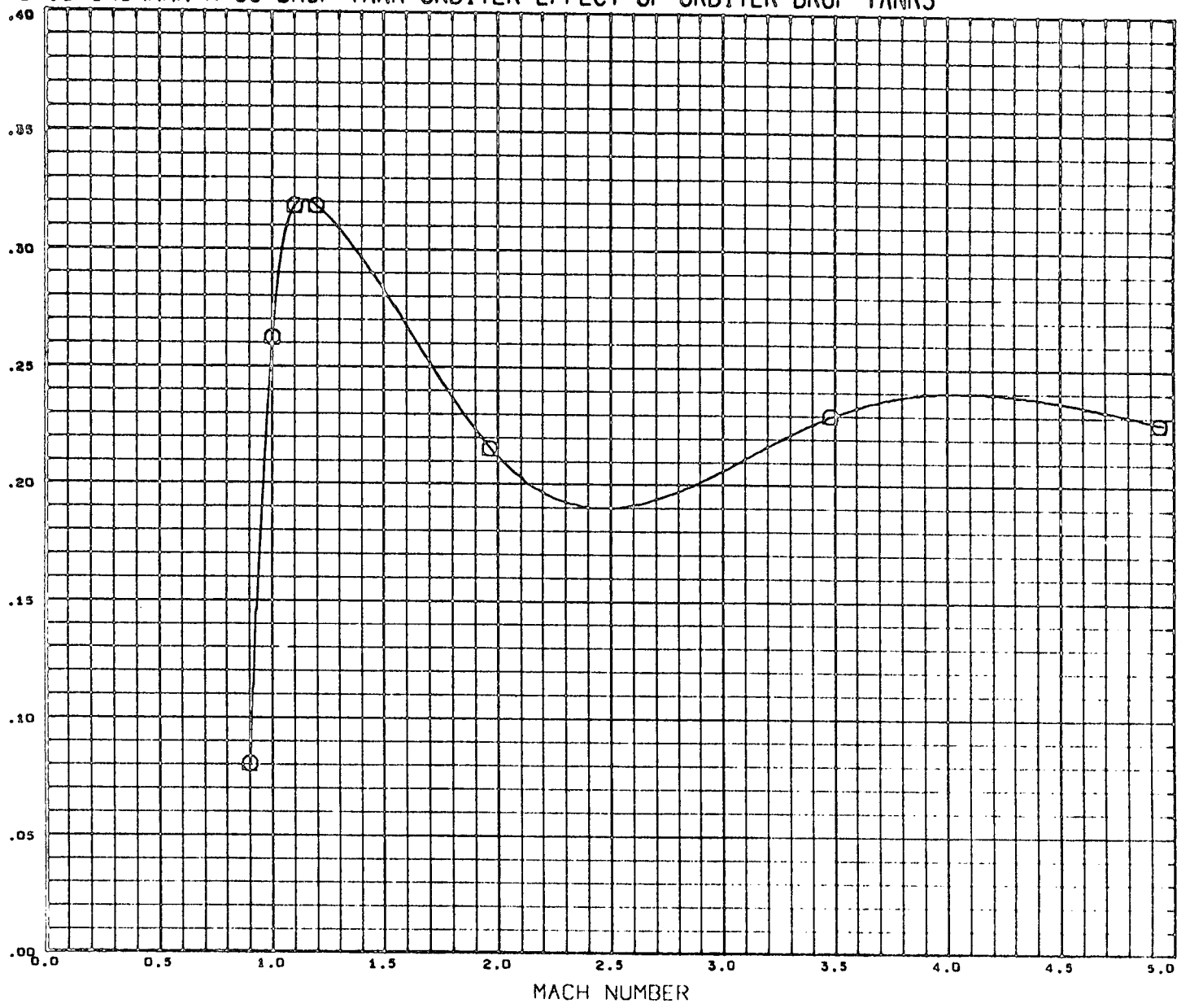
SYMBOL	ALPHA		PARAMETRIC VALUES		
O	0.000	BETA	0.000	PHI	0.000

DATA HIST. CODE CCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



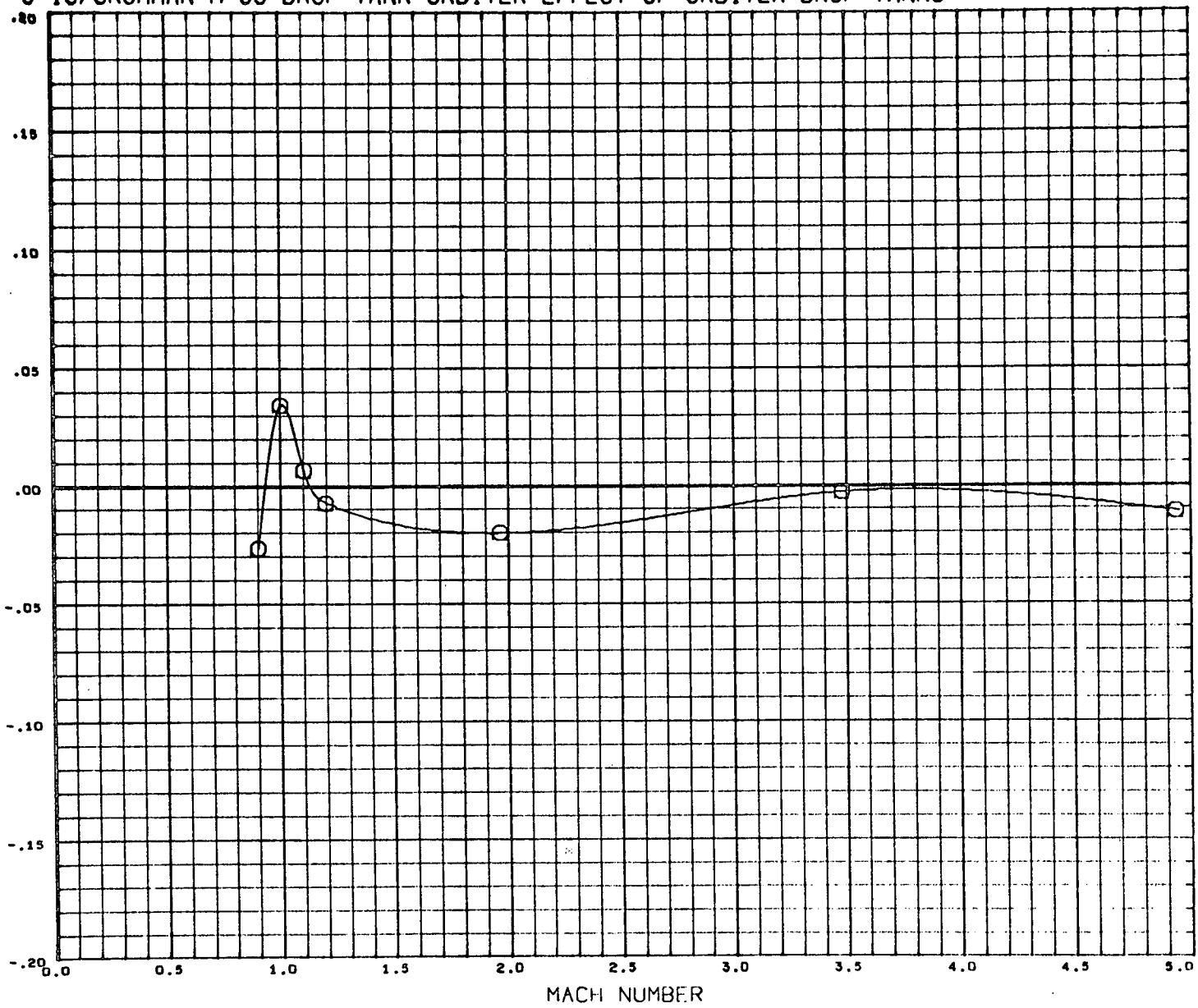
SYMBOL	ALPHA		PARAMETRIC VALUES		
○	0.000	BETA	0.000	PHI	0.000

DATA HIST. CODE CCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3900	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



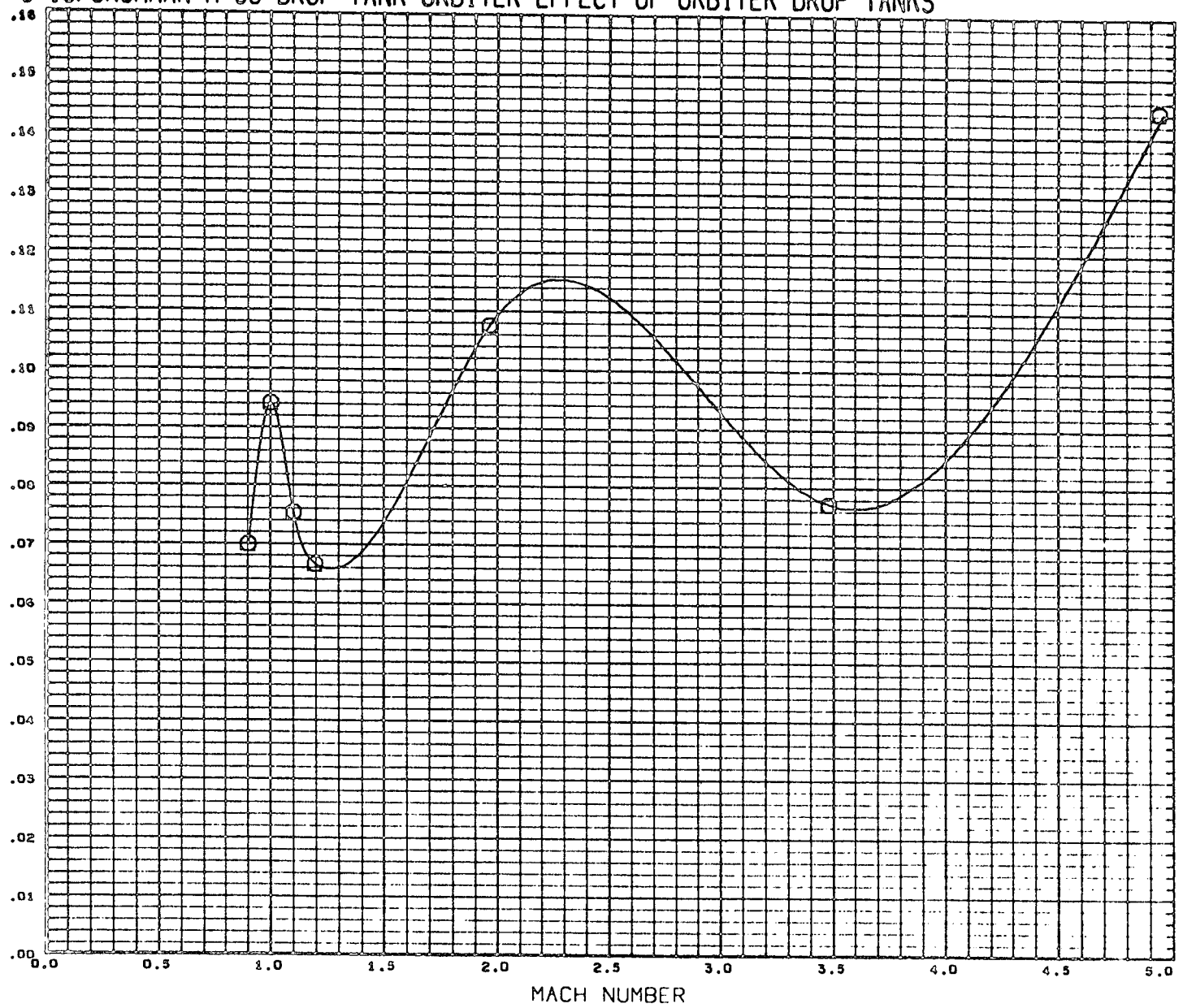
SYMBOL	ALPHA		PARAMETRIC VALUES		
○	0.000	BETA	0.000	PHI	0.000

DATA HIST. CODE CCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



SYMBOL	ALPHA		PARAMETRIC VALUES		
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DATA HIST. CODE CCCGCIIXC

REFERENCE INFORMATION

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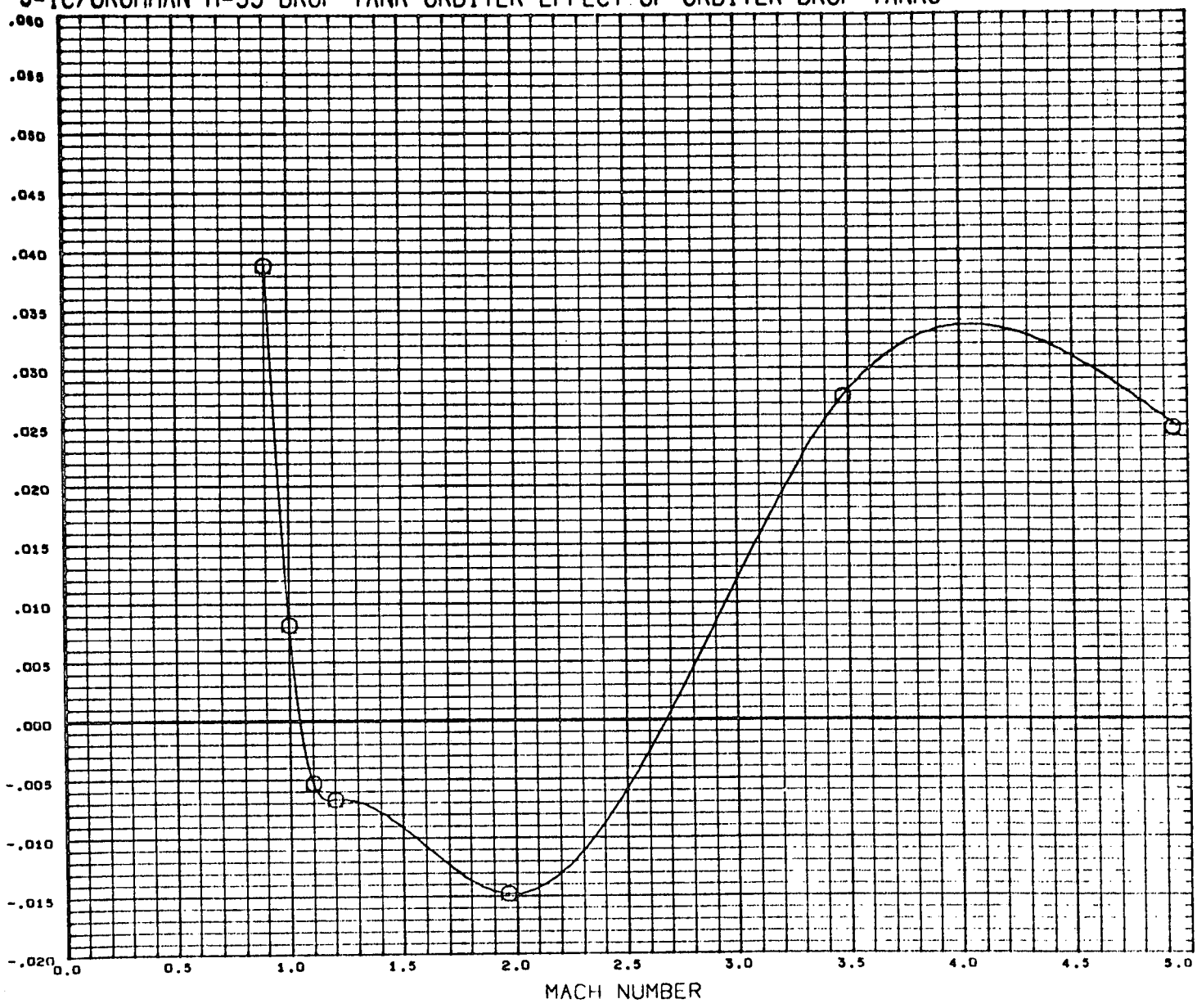
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



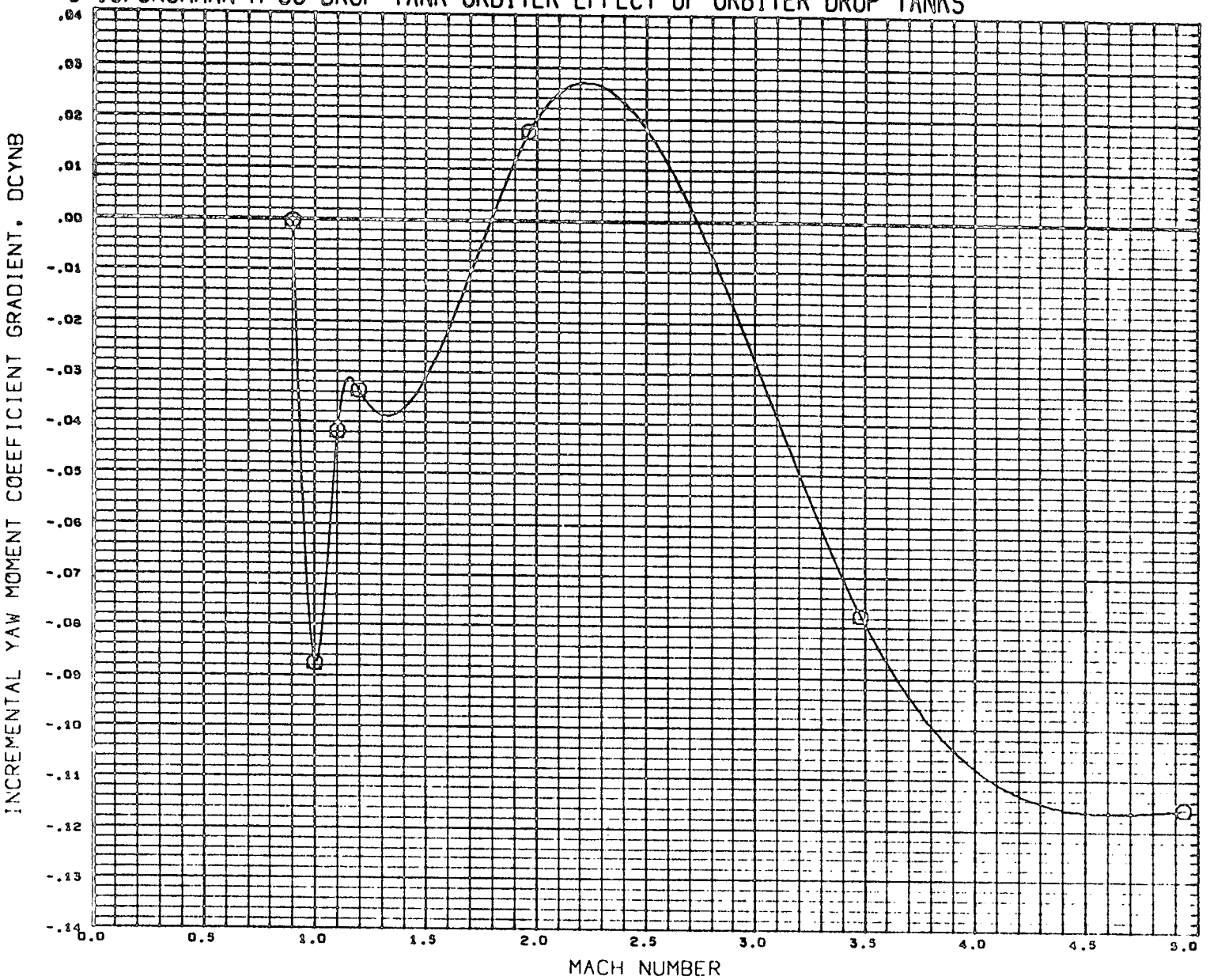
SYMBOL	BETA		PARAMETRIC VALUES		
○	0.000	ALPHA	0.000	PHI	90.000

DATA HIST. CODE *ACCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



SYMBOL	BETA		PARAMETRIC VALUES		
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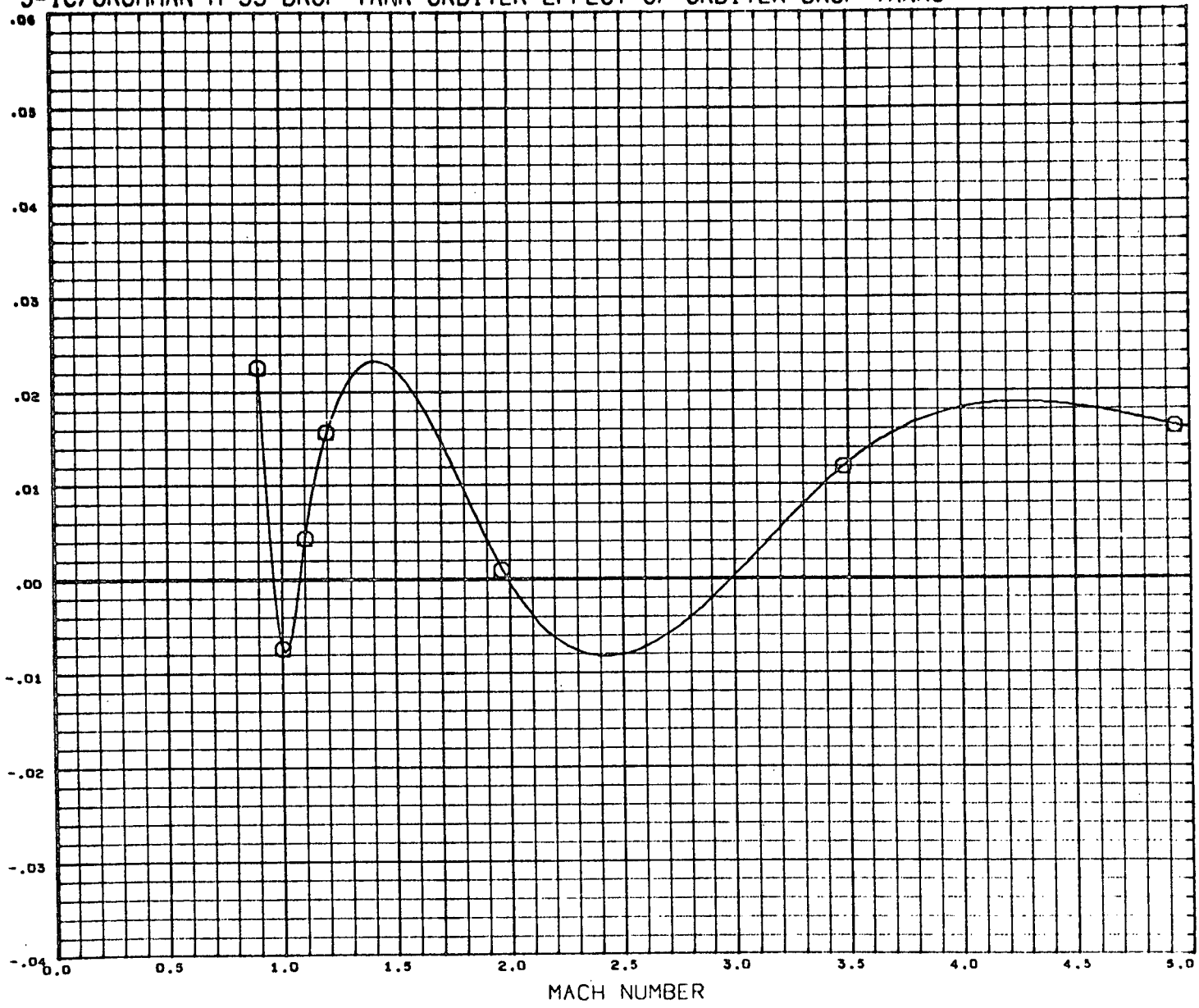
DATA HIST. CODE *ACCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



SYMBOL BETA PARAMETRIC VALUES

○ 0.000 ALPHA 0.000 PHI 90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE #ACCCGCII#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS

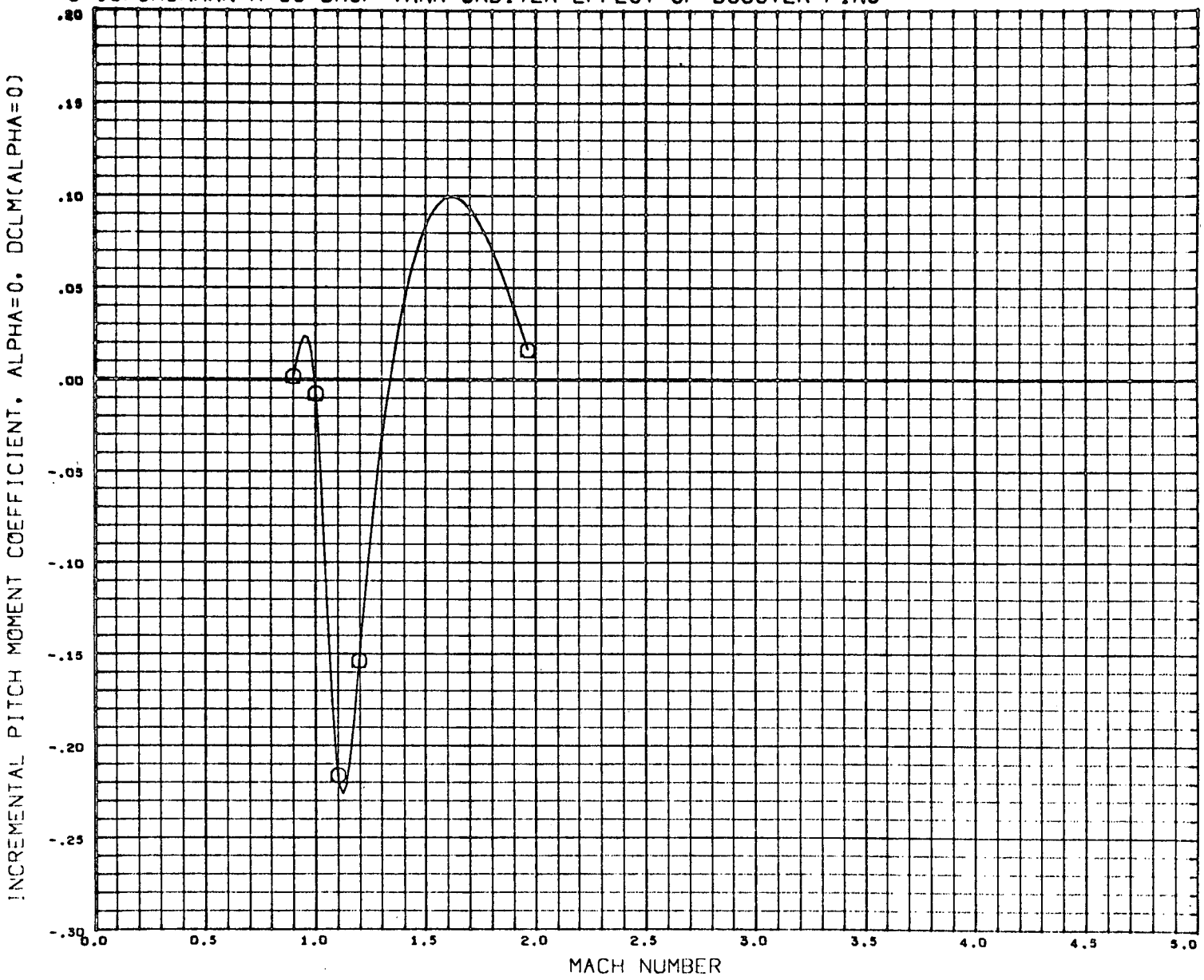
SYMBOL	ALPHA		PARAMETRIC VALUES		
O	0.000	BETA	0.000	PHI	0.000

DATA HIST. CODE CCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



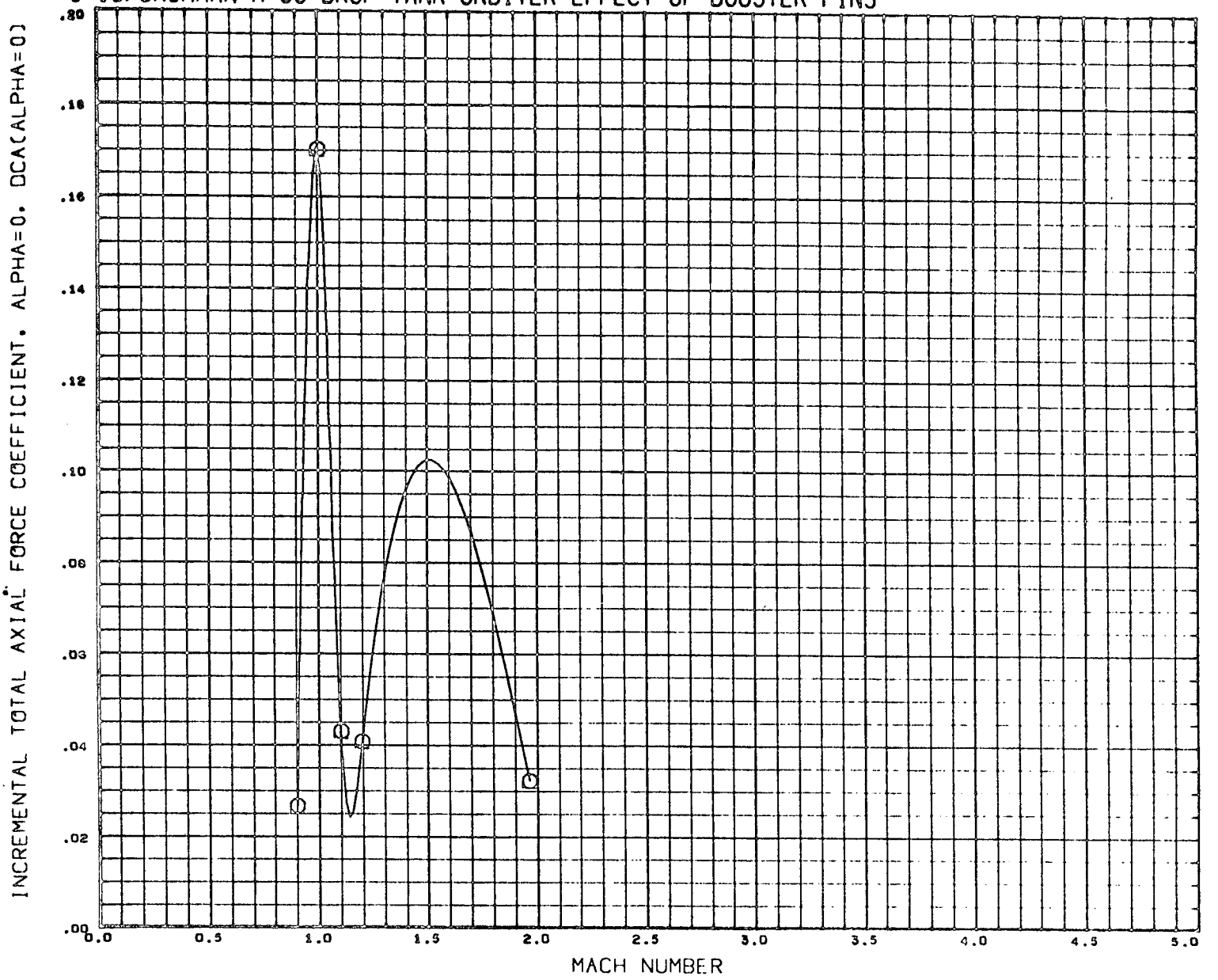
SYMBOL	ALPHA		PARAMETRIC VALUES		
O	0.000	BETA	0.000	PHI	0.000

DATA HIST. CODE CCCGCII#C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



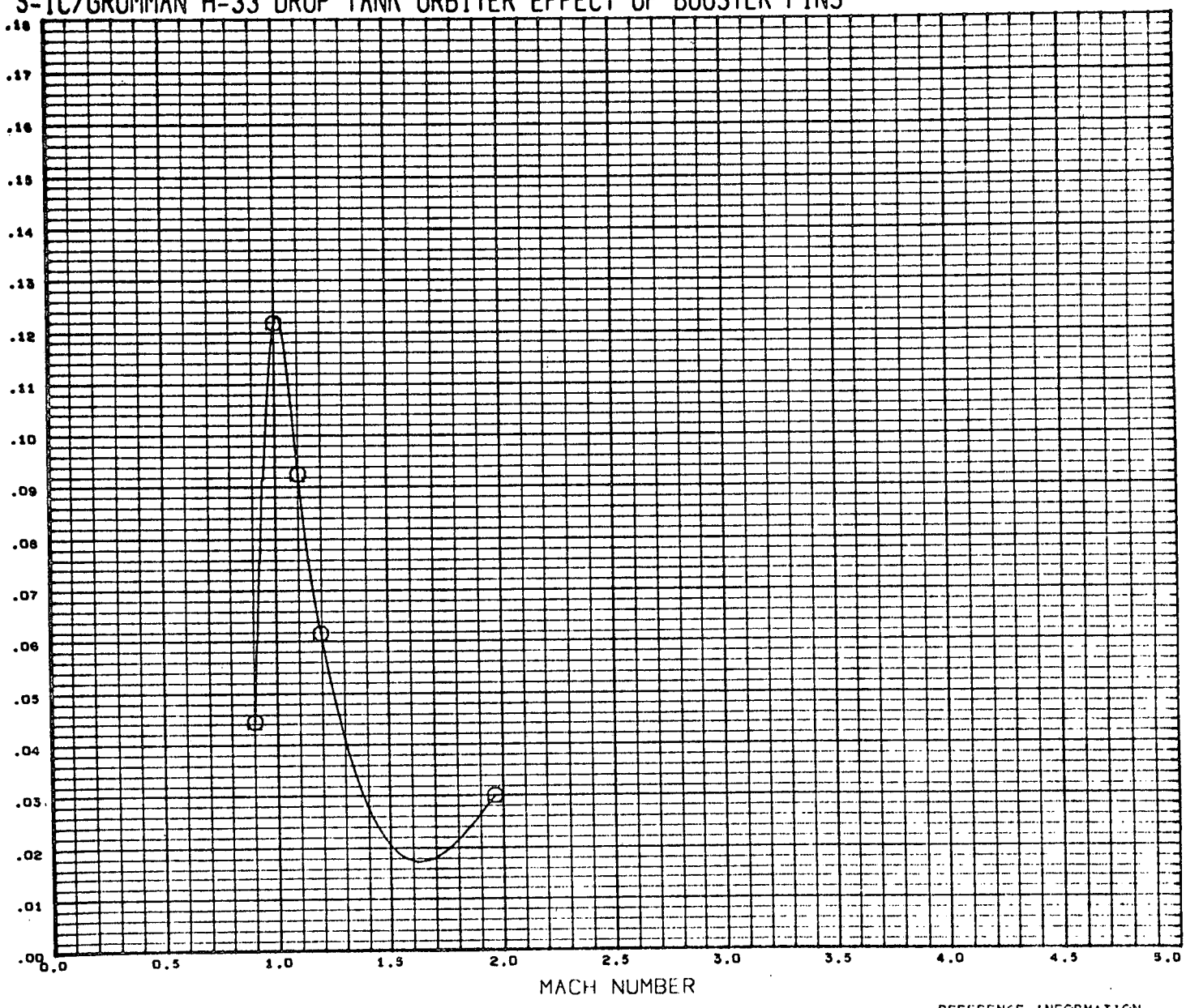
SYMBOL	ALPHA		PARAMETRIC VALUES		
O	0.000	BETA	0.000	PHI	0.000

DATA HIST. CODE CCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3390	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



SYMBOL	ALPHA		PARAMETRIC VALUES		
○	0.000	BETA	0.000	PHI	0.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCII4C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS

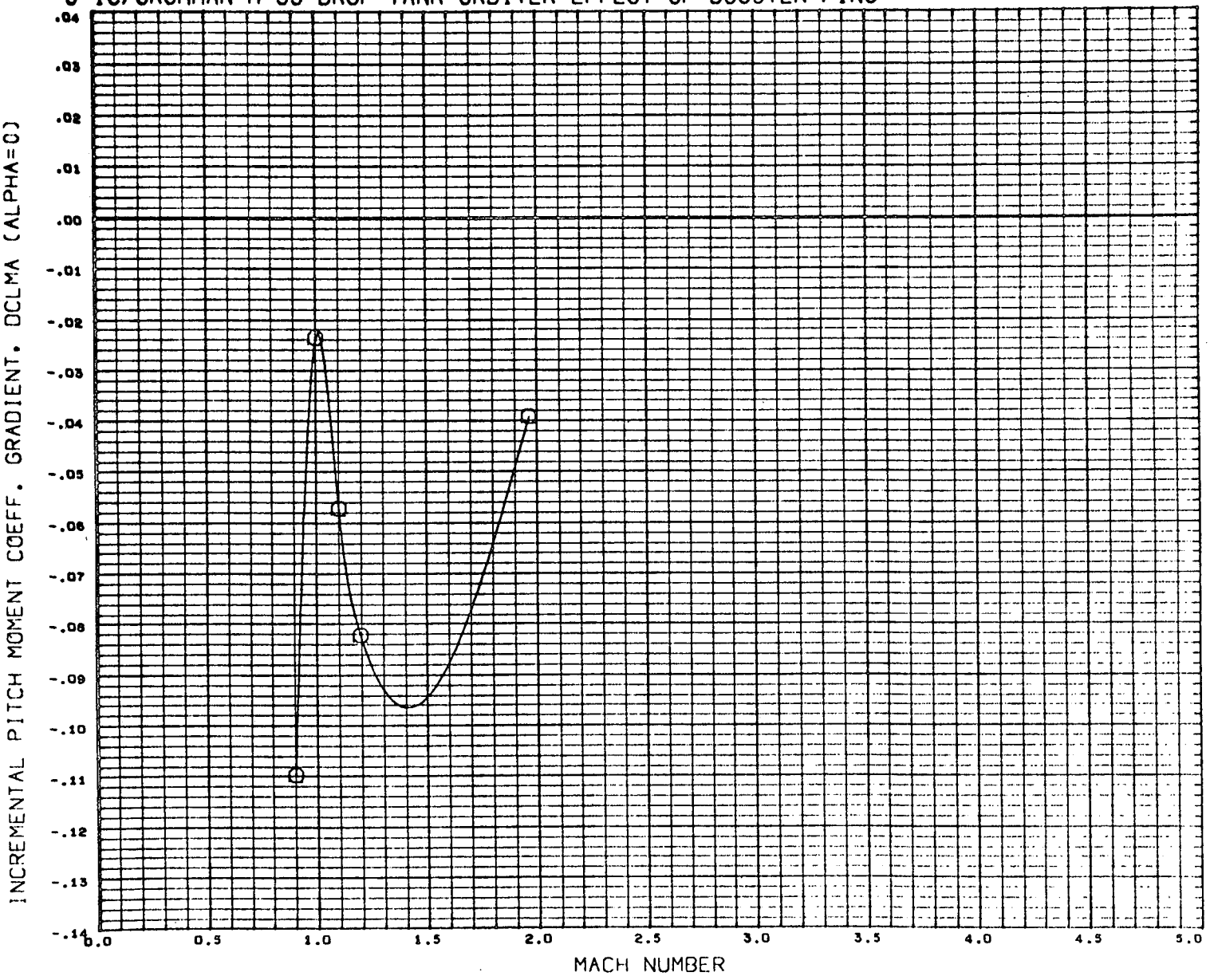
SYMBOL	ALPHA		PARAMETRIC VALUES		
O	0.000	BETA	0.000	PHI	0.000

DATA HIST. CODE CCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



SYMBOL	ALPHA		PARAMETRIC VALUES		
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DATA HIST. CODE CCCGCII%C

REFERENCE INFORMATION		
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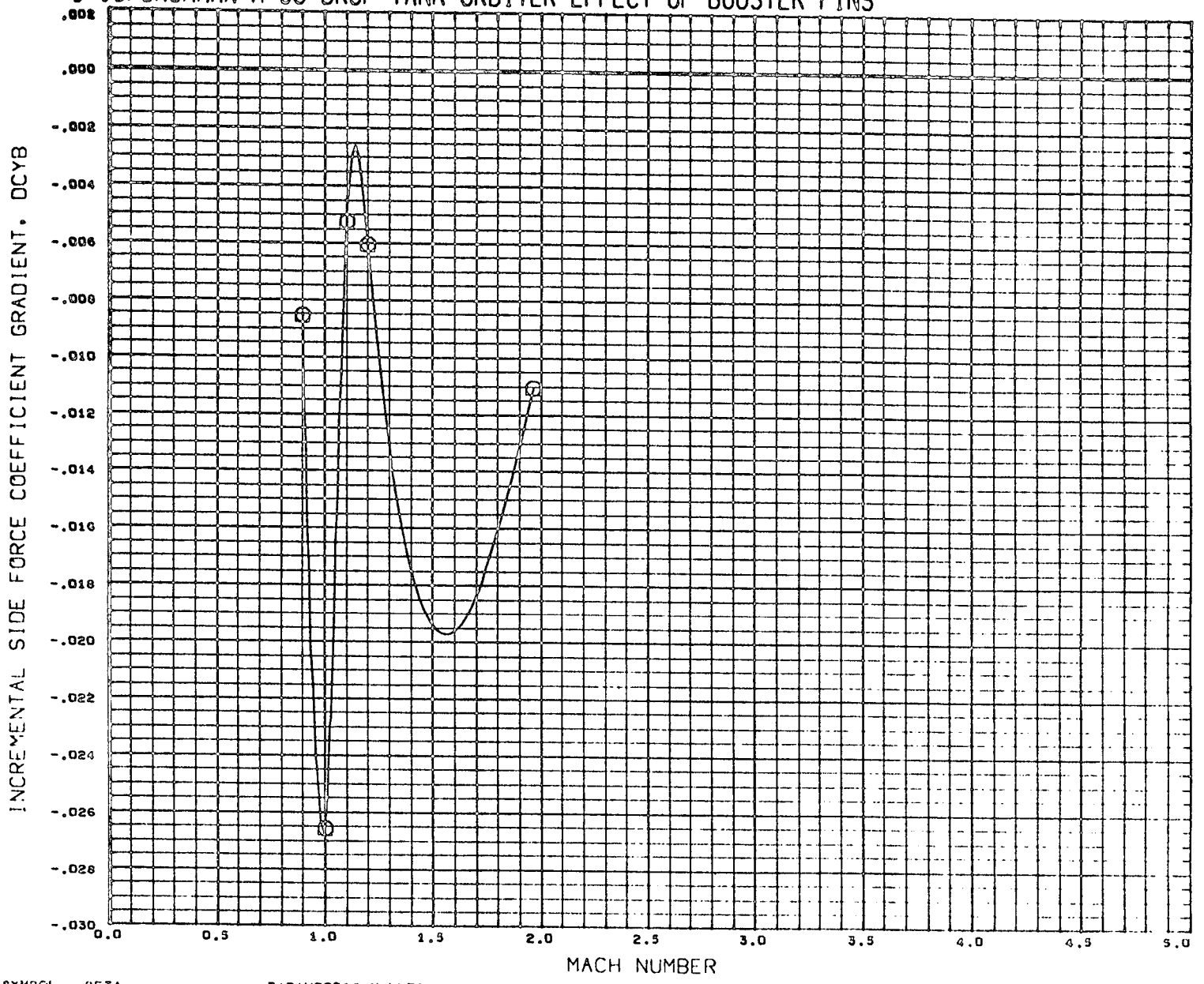
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



SYMBOL	BETA		PARAMETRIC VALUES		
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REFERENCE INFORMATION

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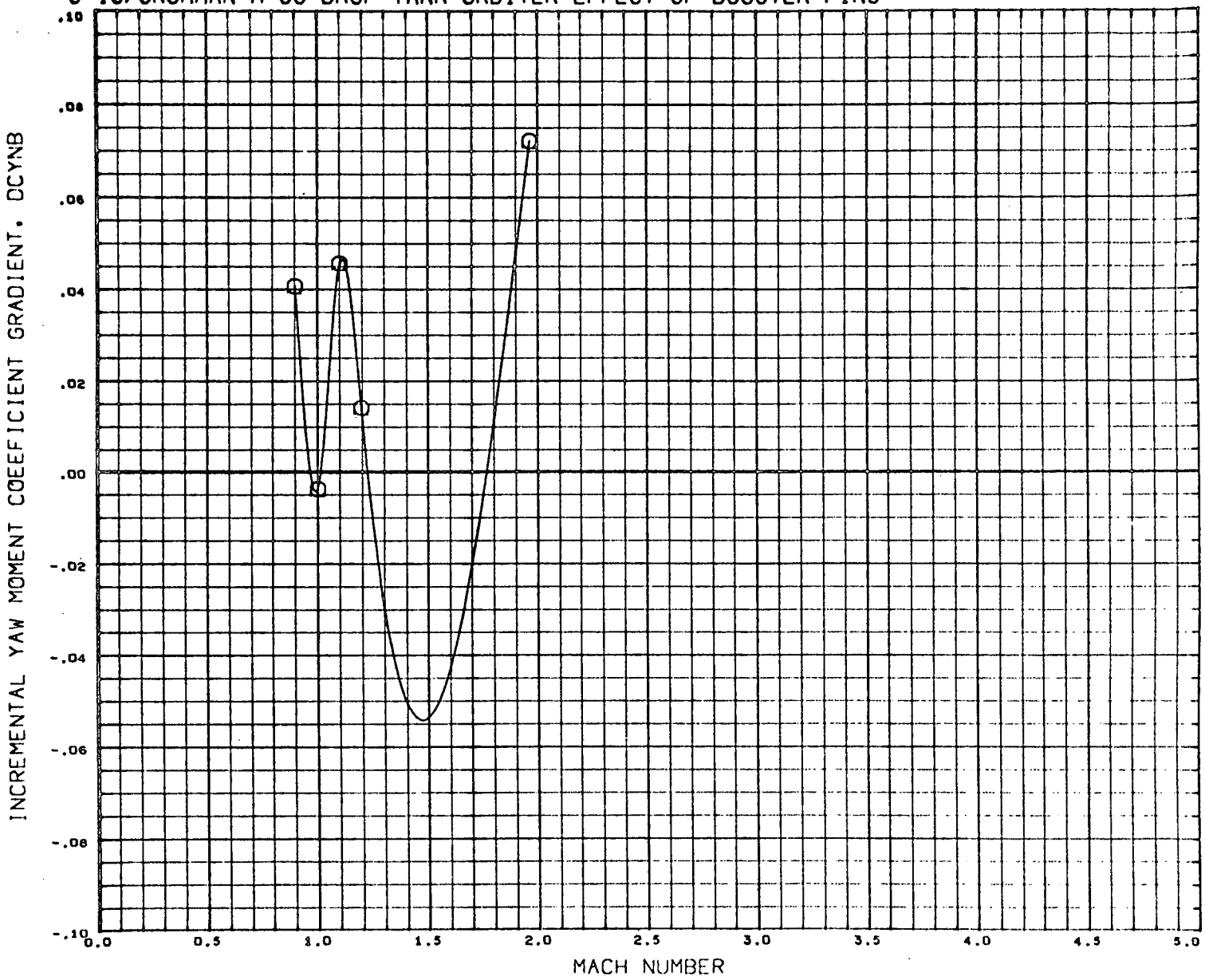
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCGCII*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



SYMBOL	BETA		PARAMETRIC VALUES		
○	0.000	ALPHA	0.000	PHI	90.000

DATA HIST. CODE *ACCCGCII*C

REFERENCE INFORMATION

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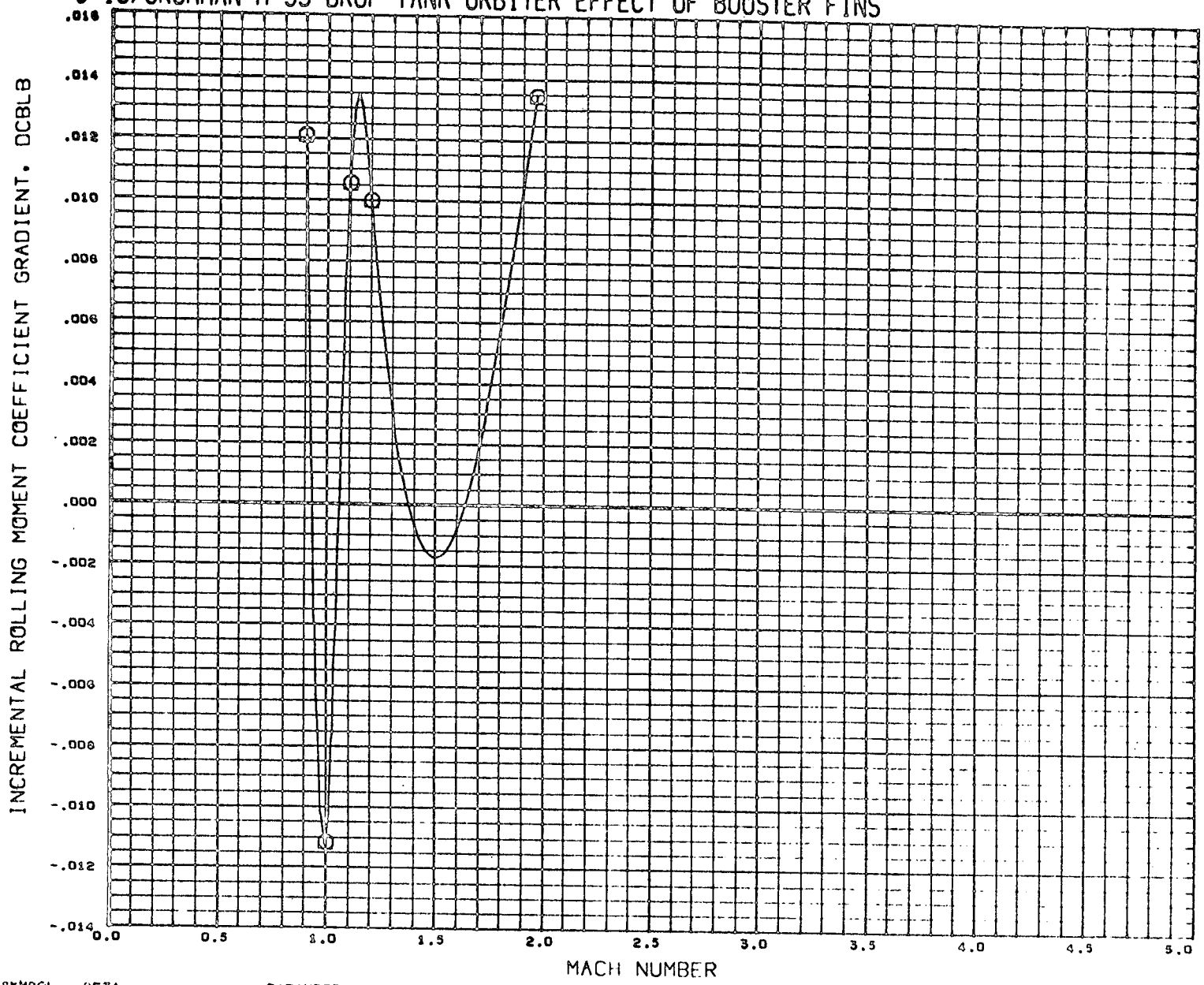
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



SYMBOL	BETA		PARAMETRIC VALUES		
O	0.000	ALPHA	0.000	PHI	90.000

DATA HIST. CODE *ACCCGCII*C

REFERENCE INFORMATION

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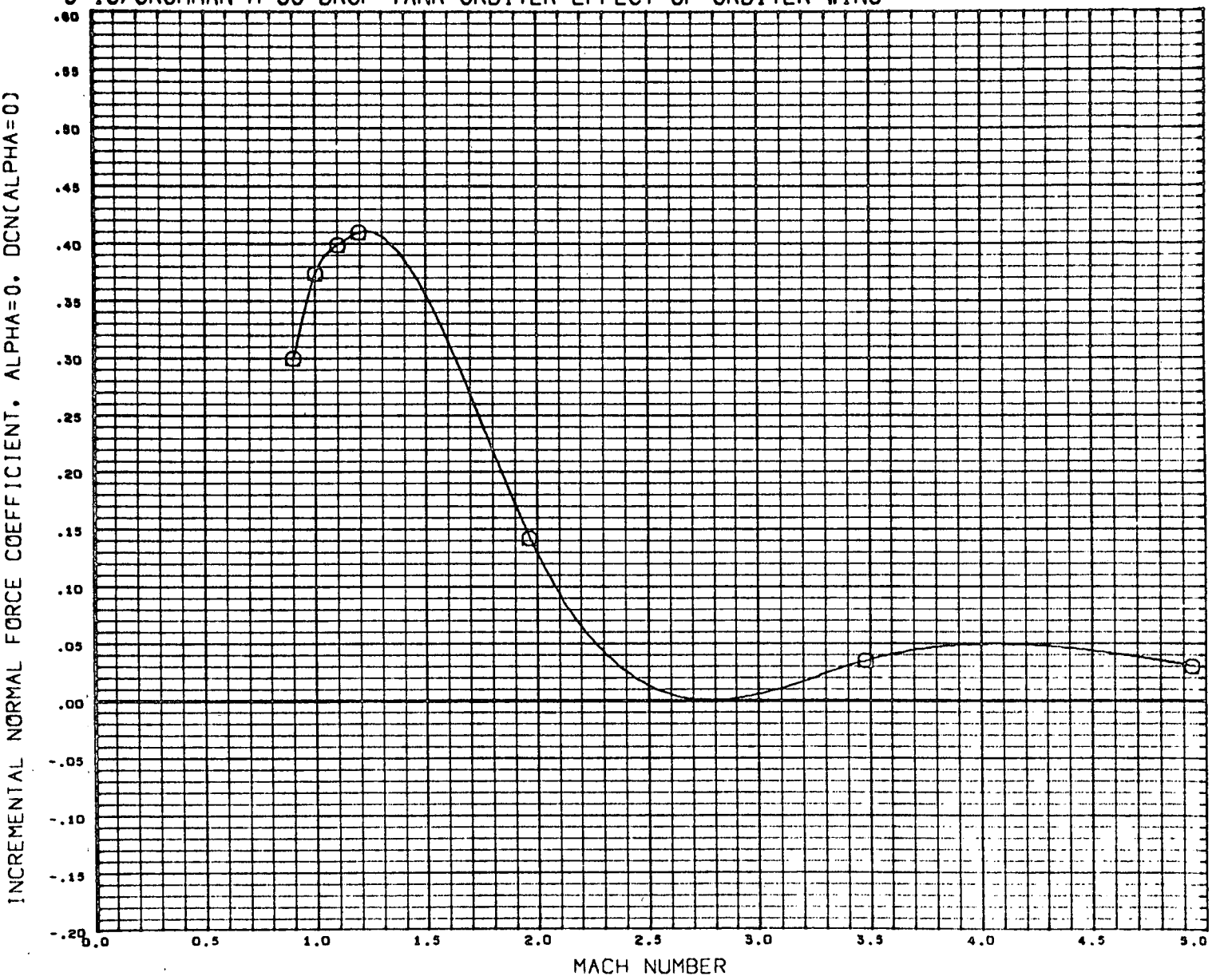
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



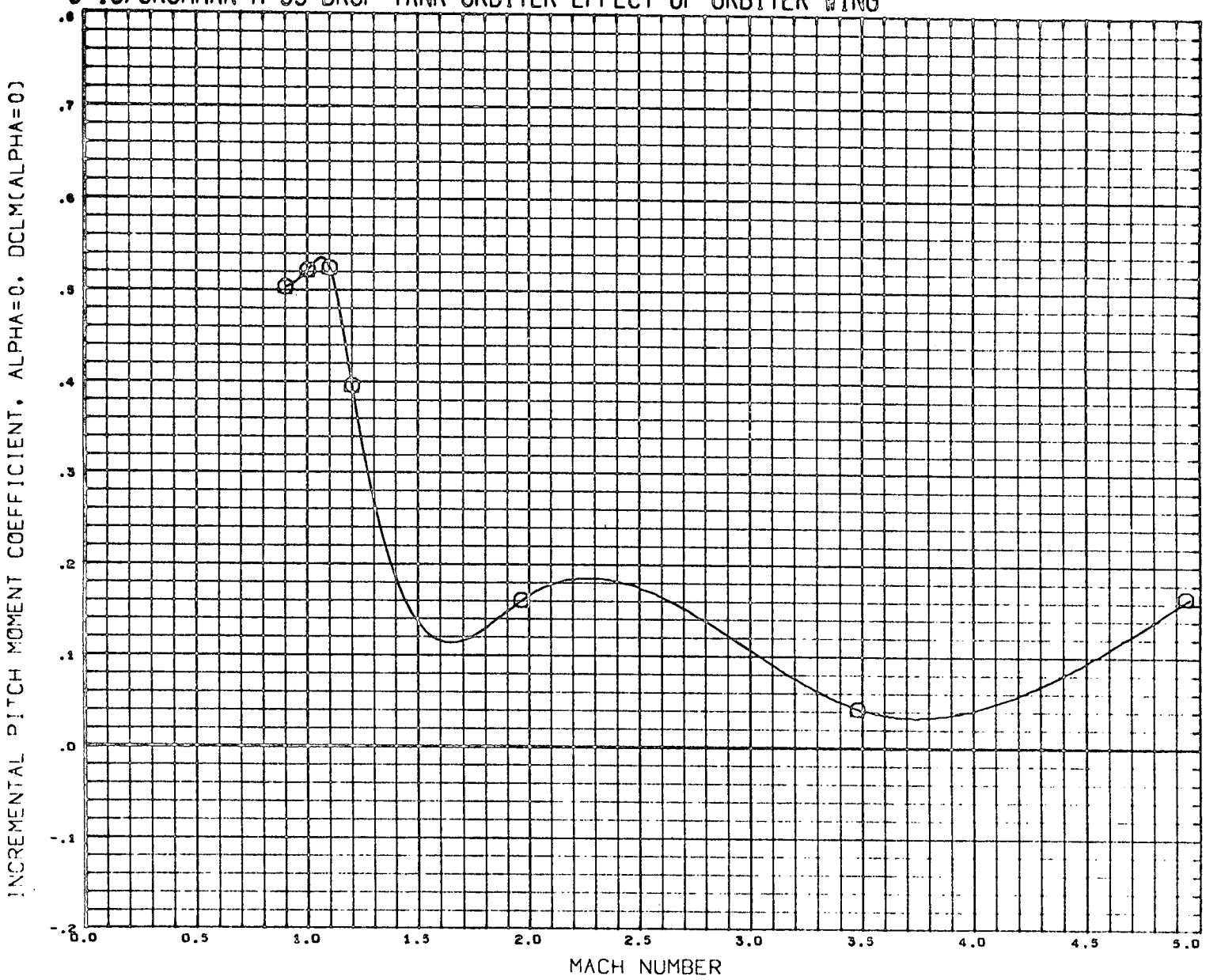
SYMBOL	ALPHA	PARAMETRIC VALUES			
○	0.000	BETA	0.000	PHI	0.000
		WNGIN	0.000		

DATA HIST. CODE CCCGCII#C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



SYMBOL	ALPHA		PARAMETRIC VALUES		
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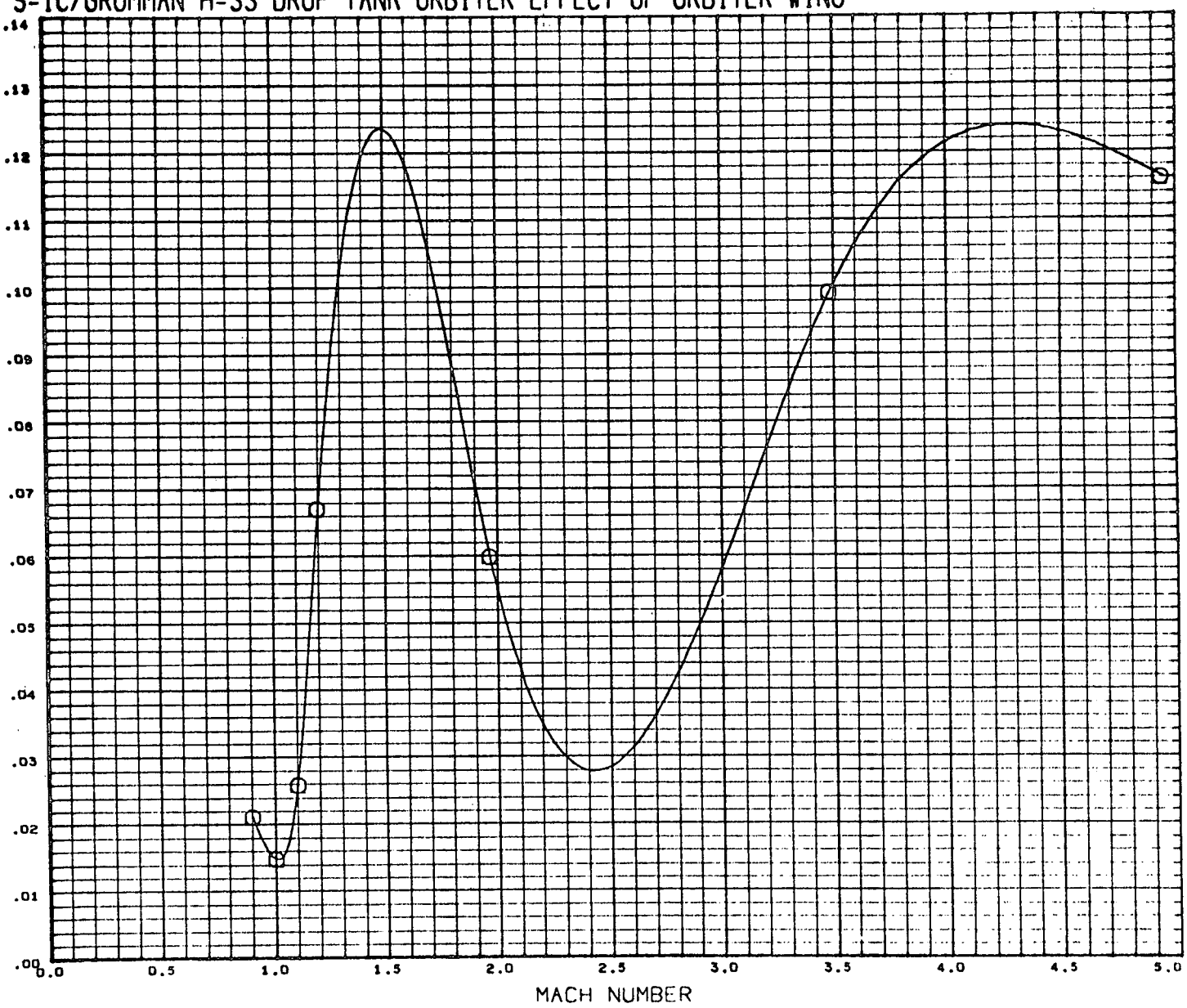
		WNGIN	0.000		

DATA HIST. CODE CCCGCII?C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



SYMBOL	ALPHA	PARAMETRIC VALUES			
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		WIGIN	0.000		

DATA HIST. CODE CCCGCII*C

REFERENCE INFORMATION

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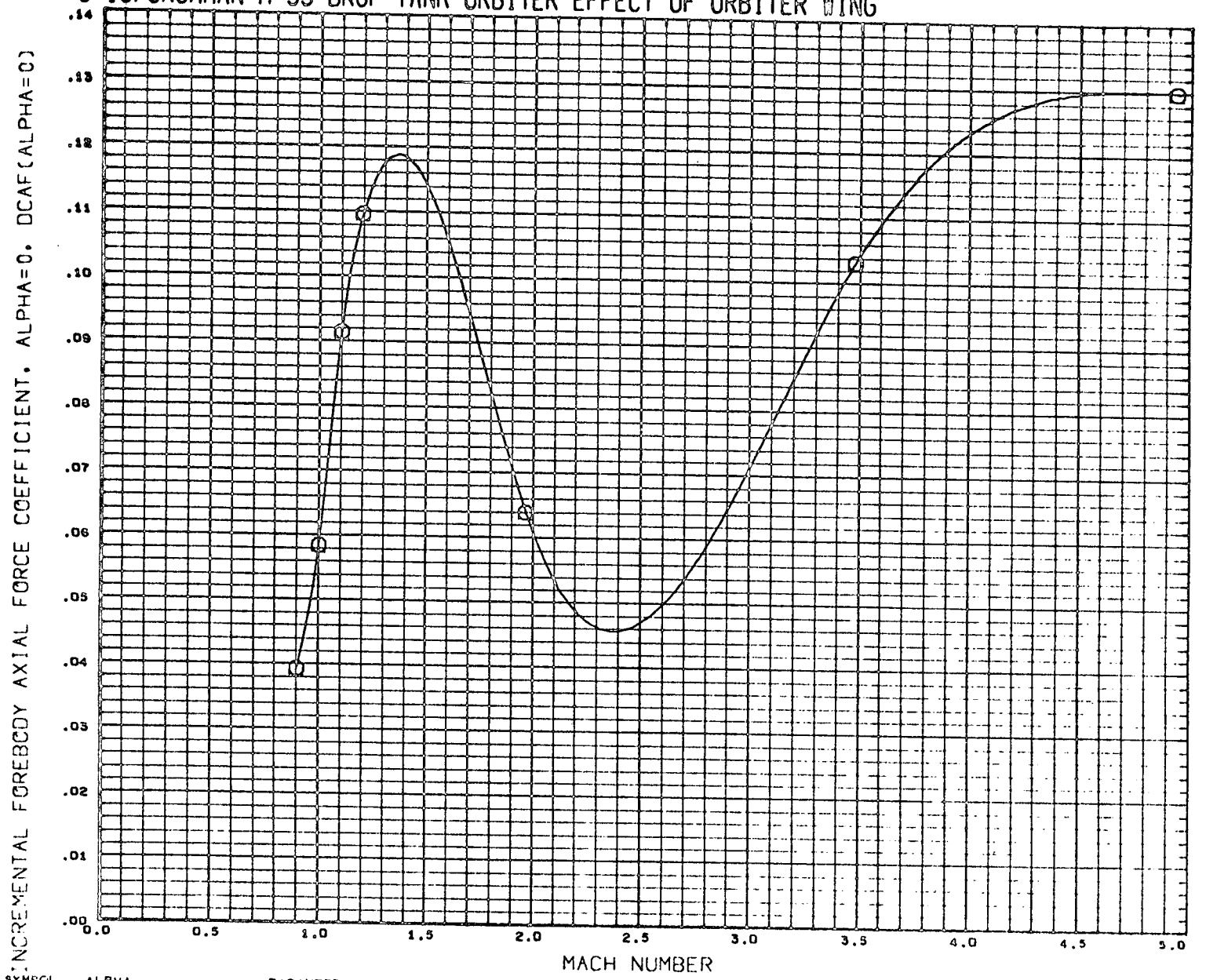
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



SYMBOL	ALPHA	PARAMETRIC VALUES			
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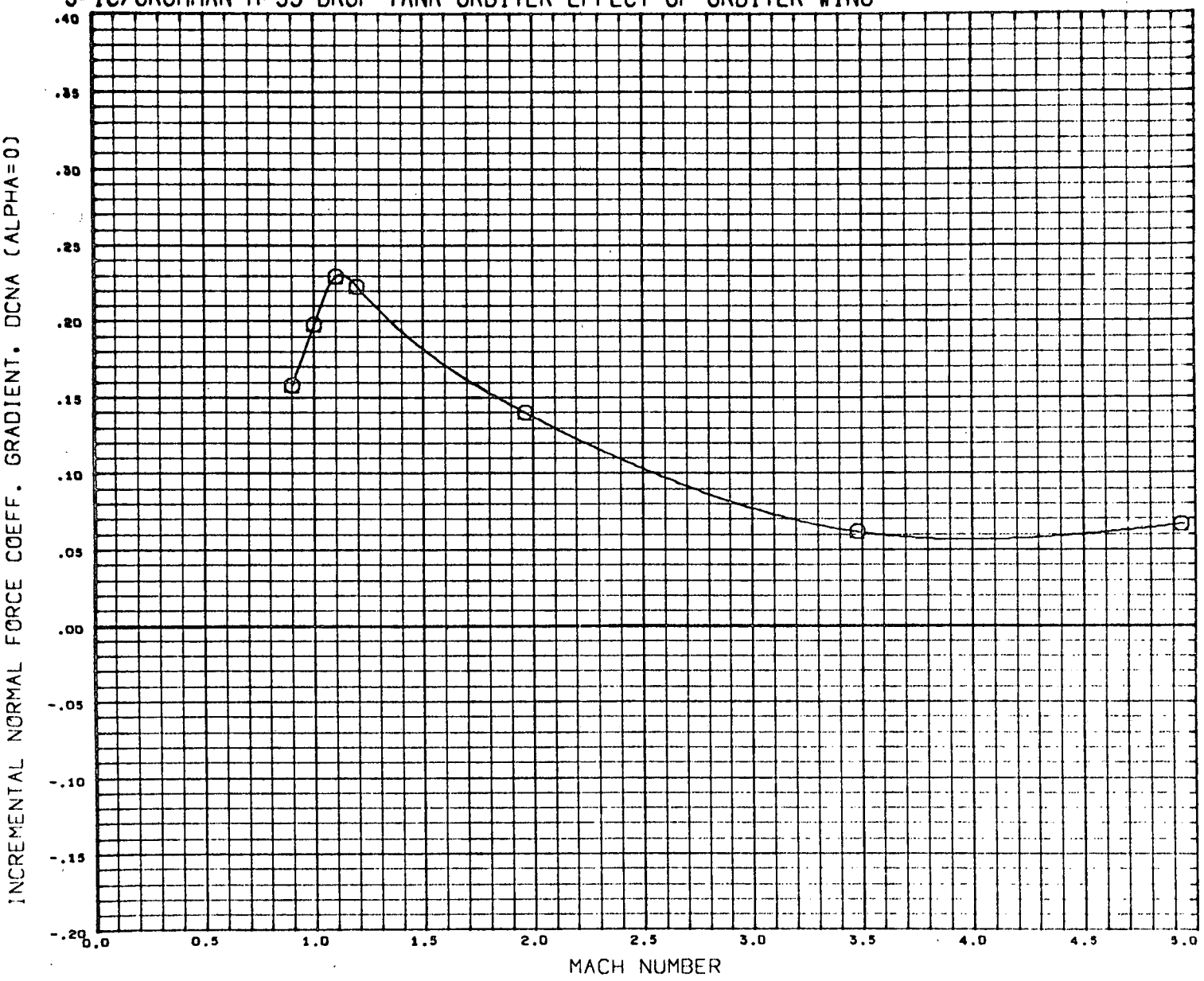
		WNGIN	0.000		

DATA HIST. CODE CCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



SYMBOL	ALPHA	PARAMETRIC VALUES			
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		WNGIN	0.000		

DATA HIST. CODE CCCGC11*C

REFERENCE INFORMATION

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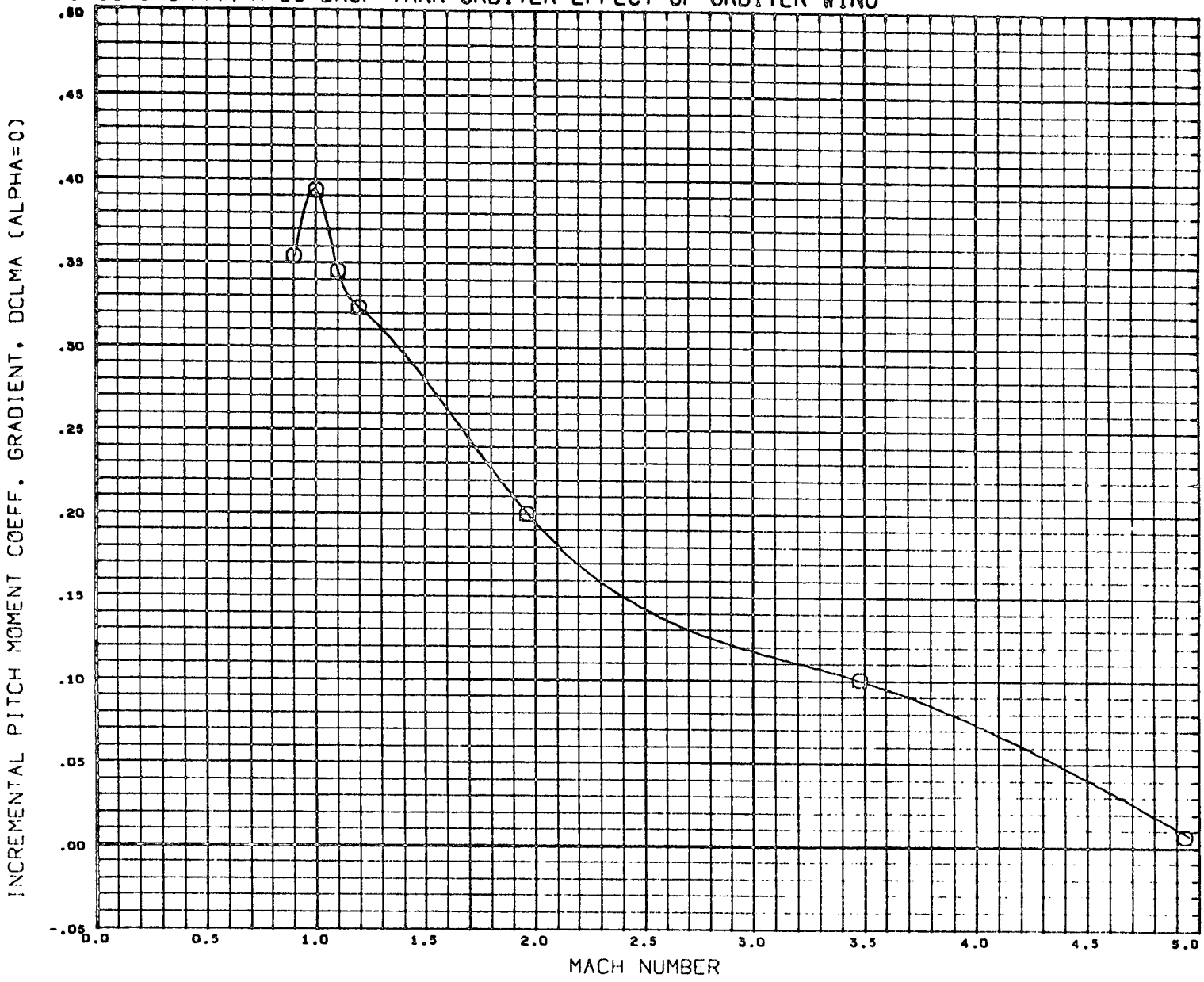
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



SYMBOL	ALPHA		PARAMETRIC VALUES		
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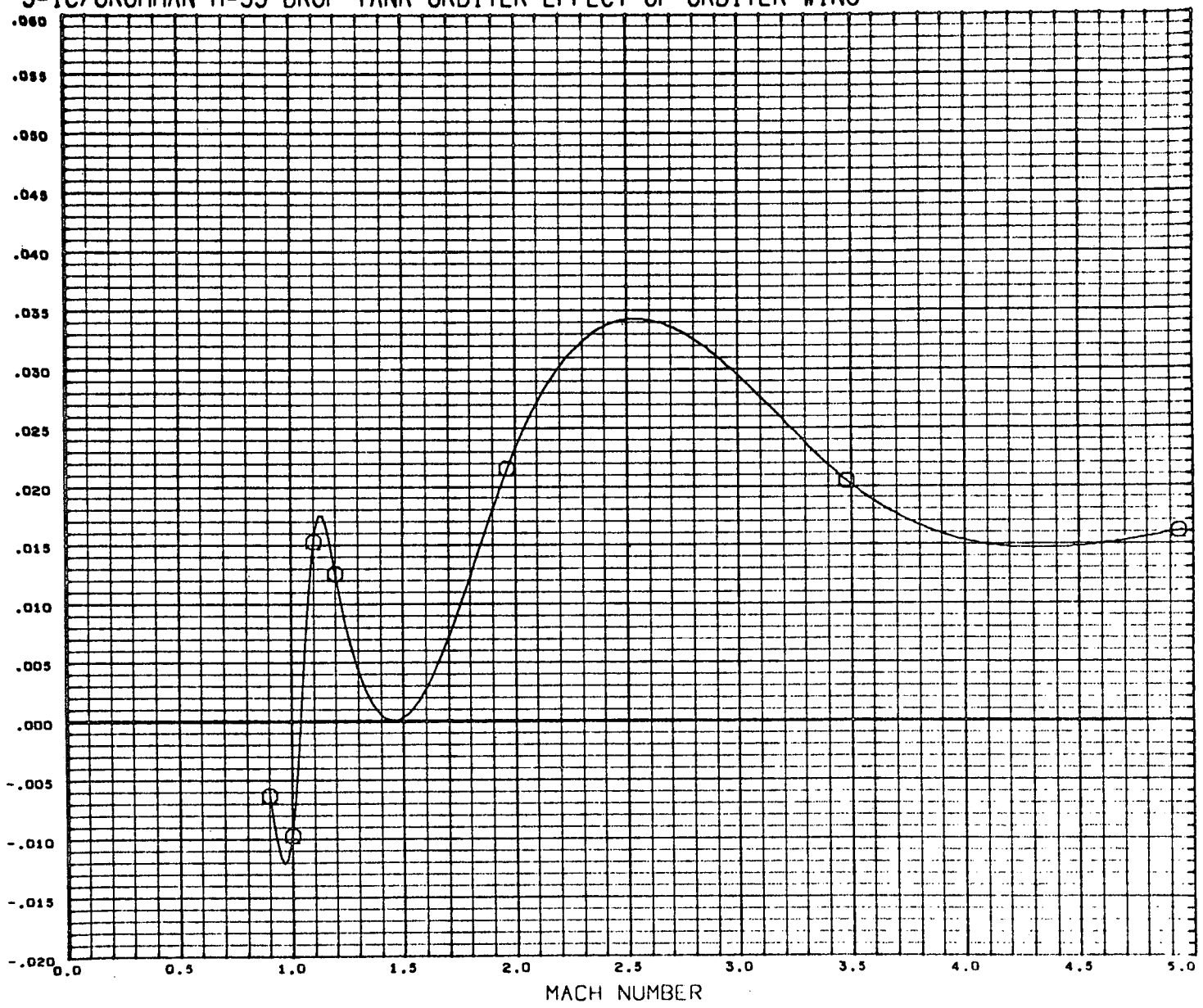
		WNGIN	0.000		

DATA HIST. CODE CCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



SYMBOL	BETA		PARAMETRIC VALUES		
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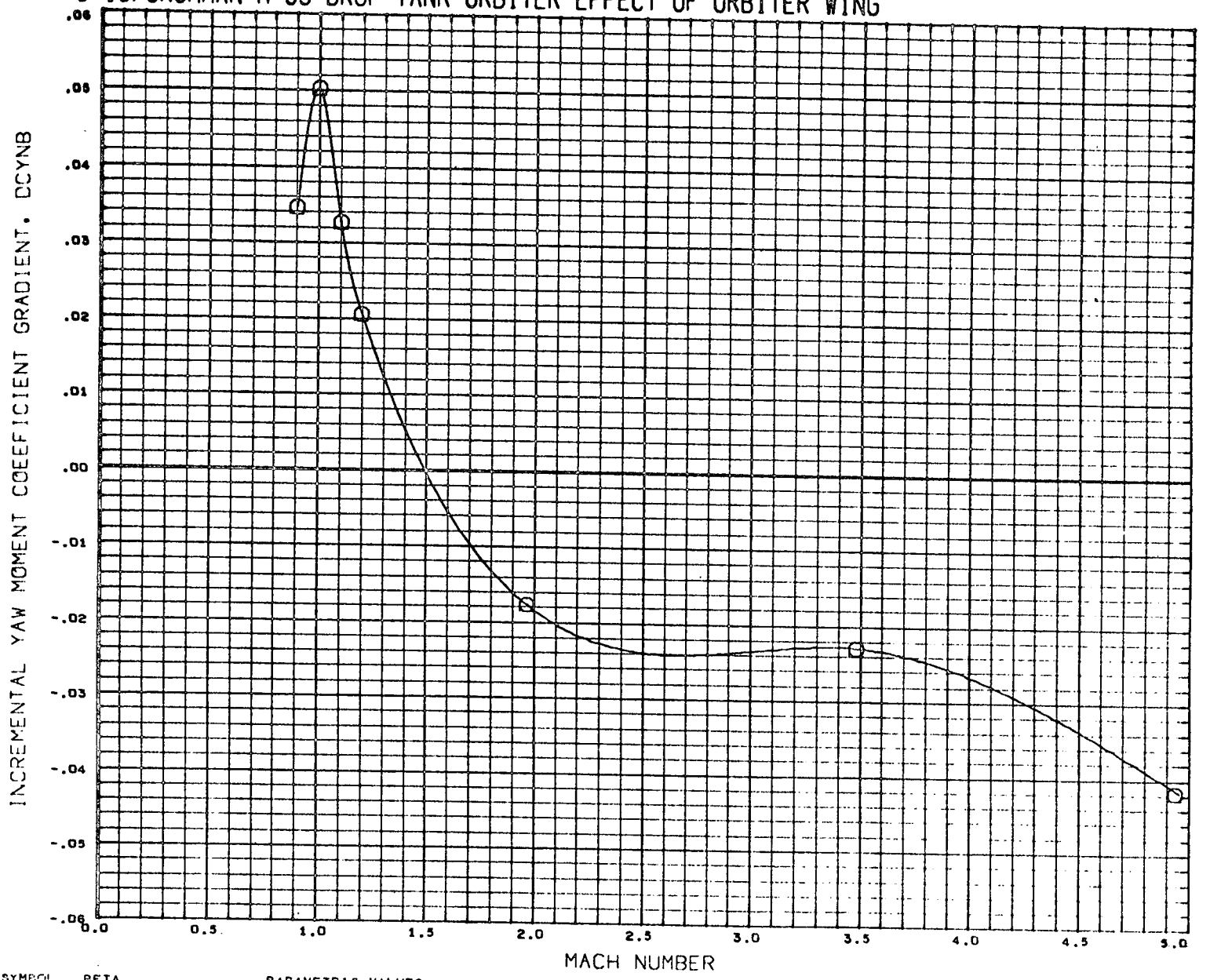
DATA HIST. CODE CCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



SYMBOL	BETA		PARAMETRIC VALUES		
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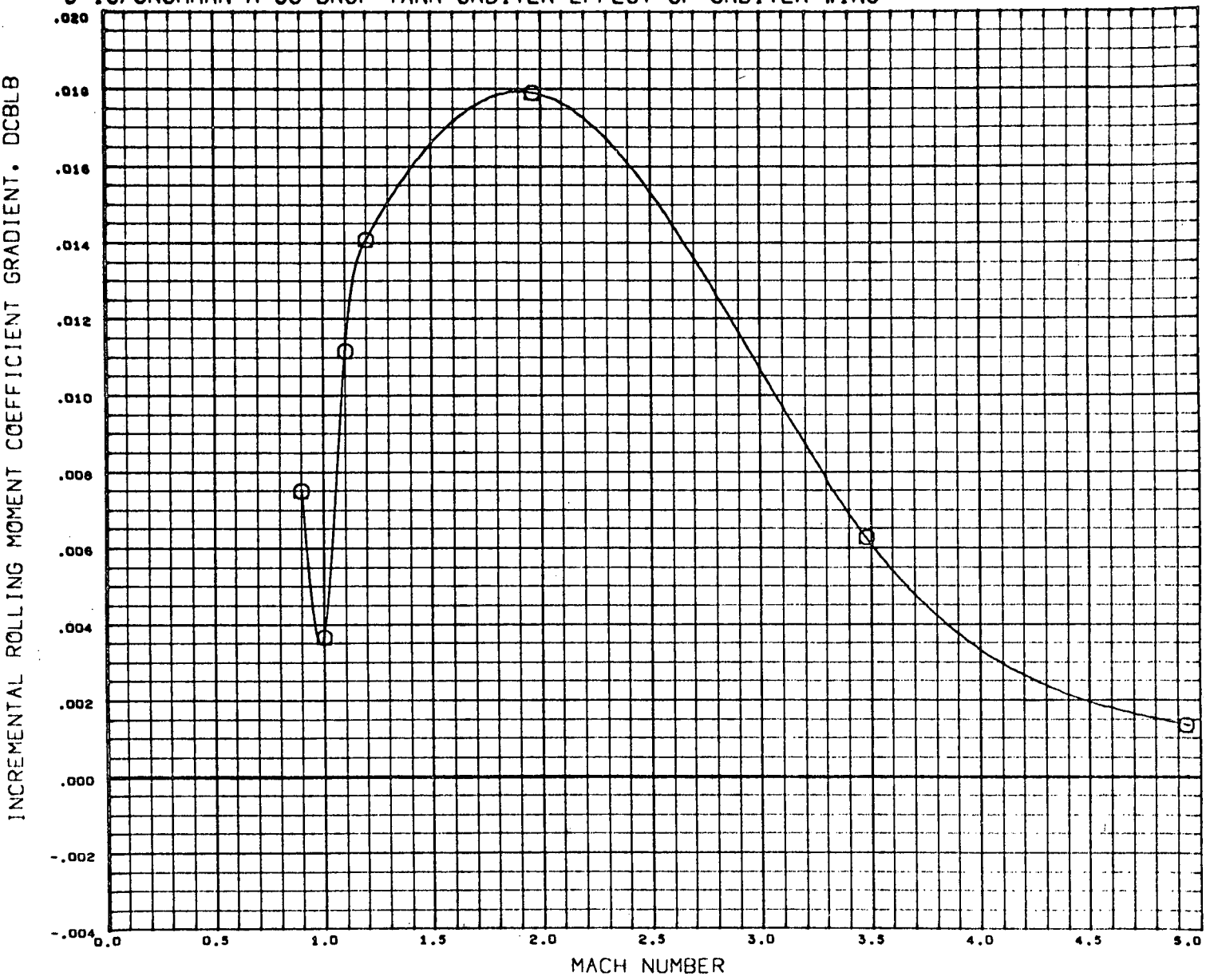
		WNGIN	0.000		

DATA HIST. CODE CCCGCII4C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



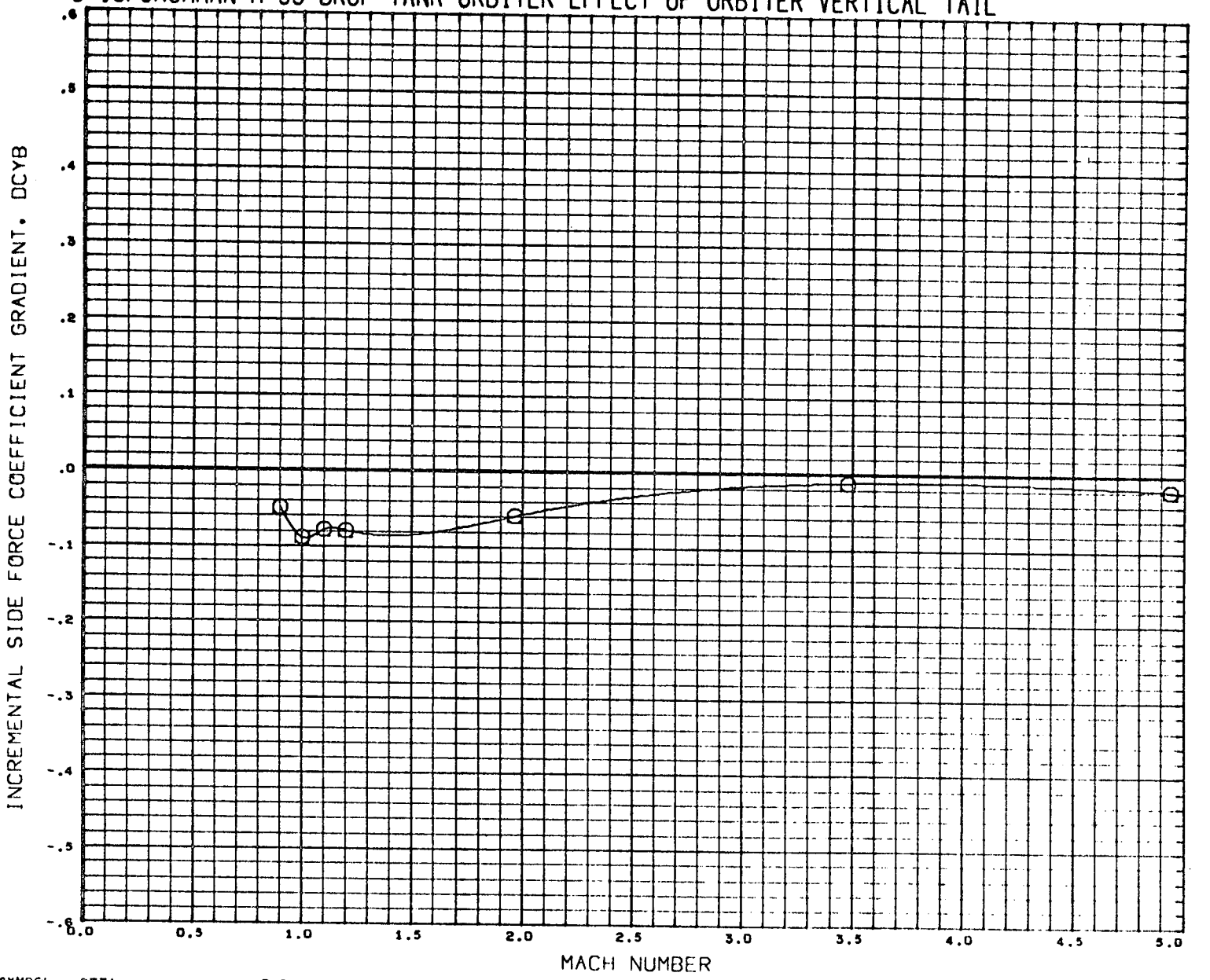
SYMBOL	BETA	PARAMETRIC VALUES			
○	0.000	ALPHA	0.000	PHI	90.000
		WNGIN	0.000		

DATA HIST. CODE CCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



SYMBOL BETA PARAMETRIC VALUES

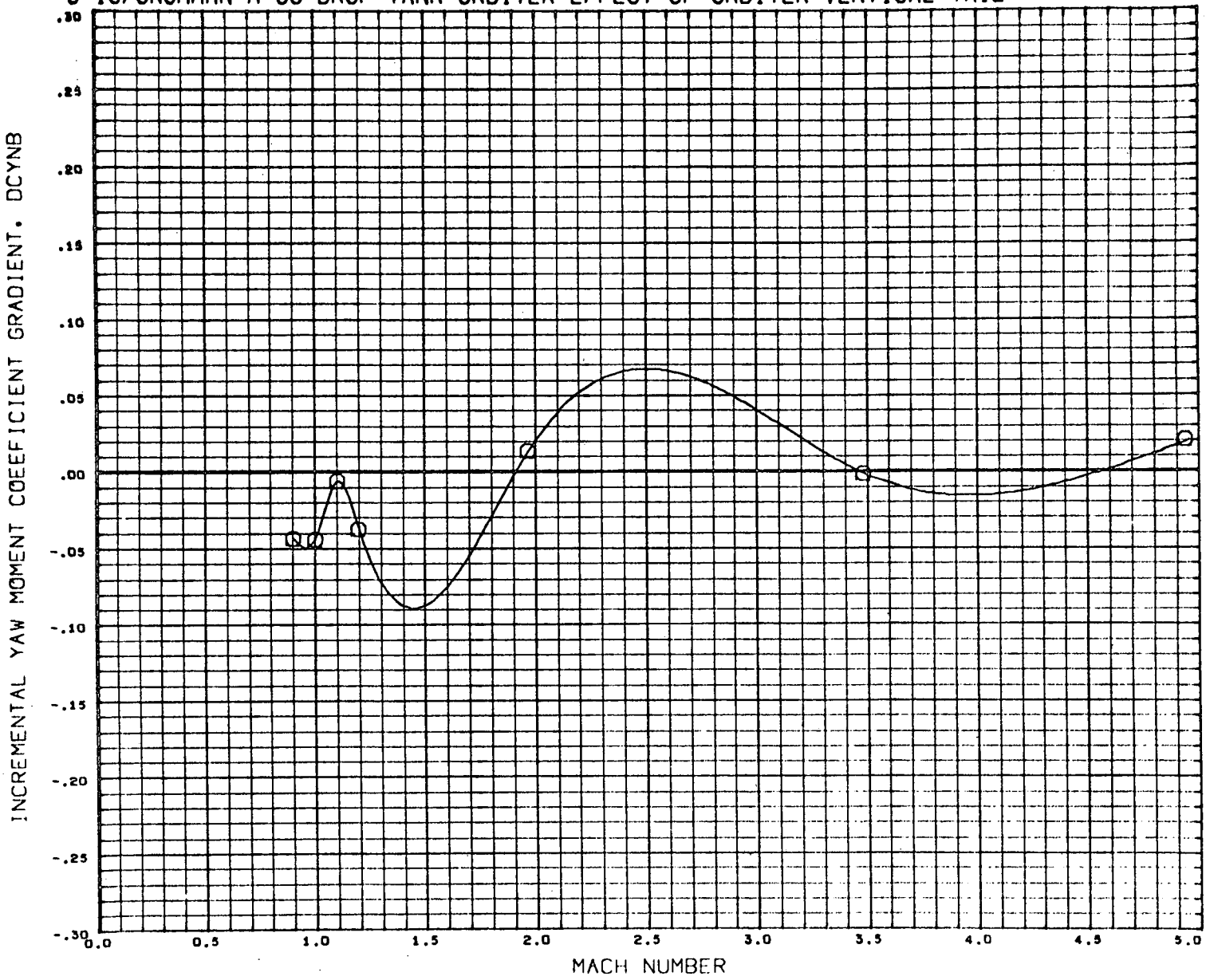
○ 0.000 ALPHA 0.000 PHI 90.000

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCGCII*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



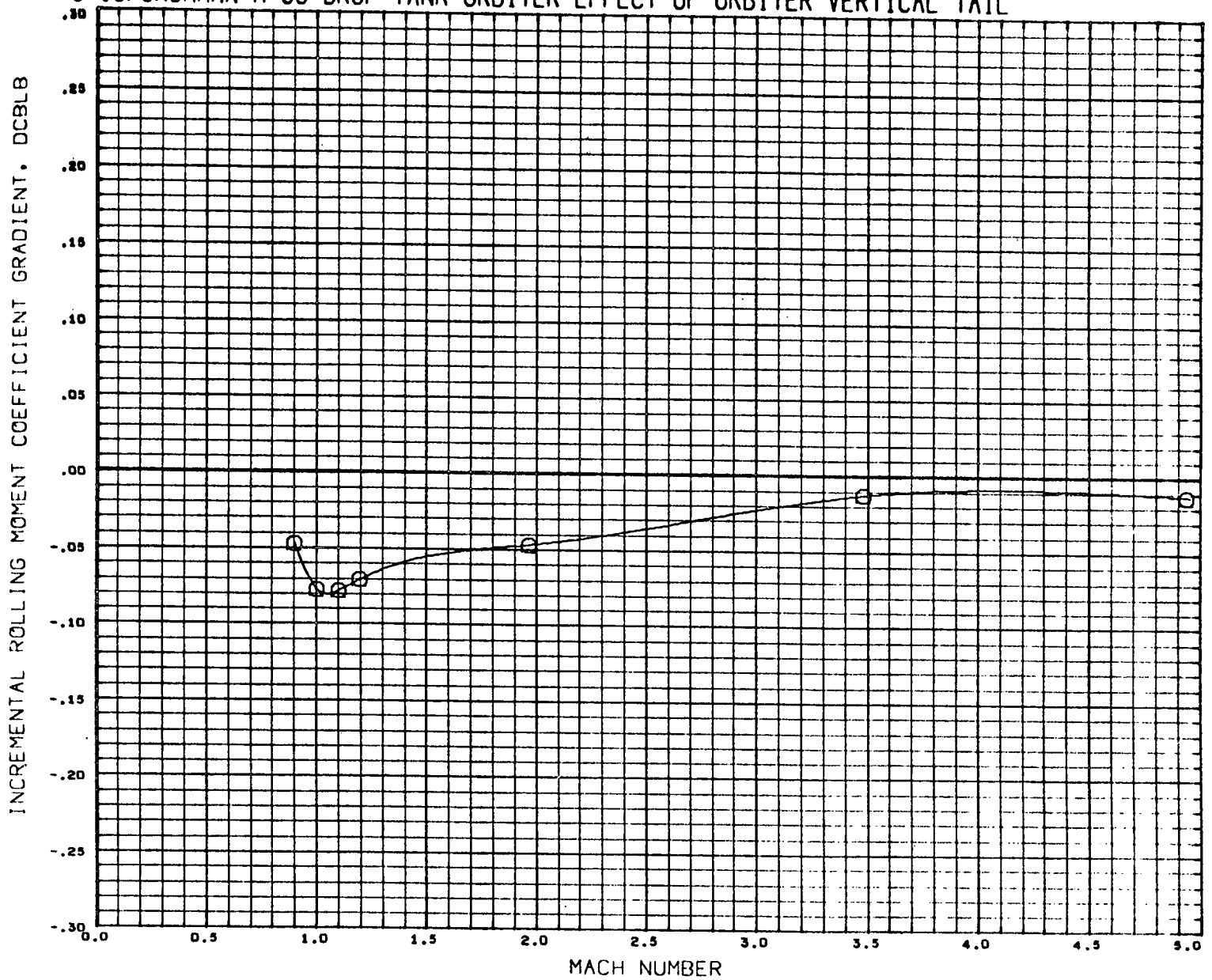
SYMBOL	BETA		PARAMETRIC VALUES		
○	0.000	ALPHA	0.000	PHI	90.000

DATA HIST. CODE *ACCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



SYMBOL	BETA		PARAMETRIC VALUES		
O	0.000	ALPHA	0.000	PHI	90.000

DATA HIST. CODE *ACCCGCII*C

REFERENCE INFORMATION

SREF	1.3960	SQ.IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	